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THE POULTRY AND EGG INDUSTRY IN EUROPE

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INTEREST IN FOREIGN POULTRY CONDITIONS

Production of poultry and eggs in the United States has been progressing at an astonishing rate, both as compared with other farm animals and as compared with the population. Since 1880 our population has slightly more than doubled, sheep have declined in numbers, hogs have remained about constant, milk cows have increased about 25 per cent, but poultry and egg production is over four times that of 1880. (See Table 1 and fig. 1.) In view of the rapid increase in production of poultry products in this country, it is not

difficult to conceive that within a few years the United States will be producing more eggs and poultry than can be readily consumed within its borders.

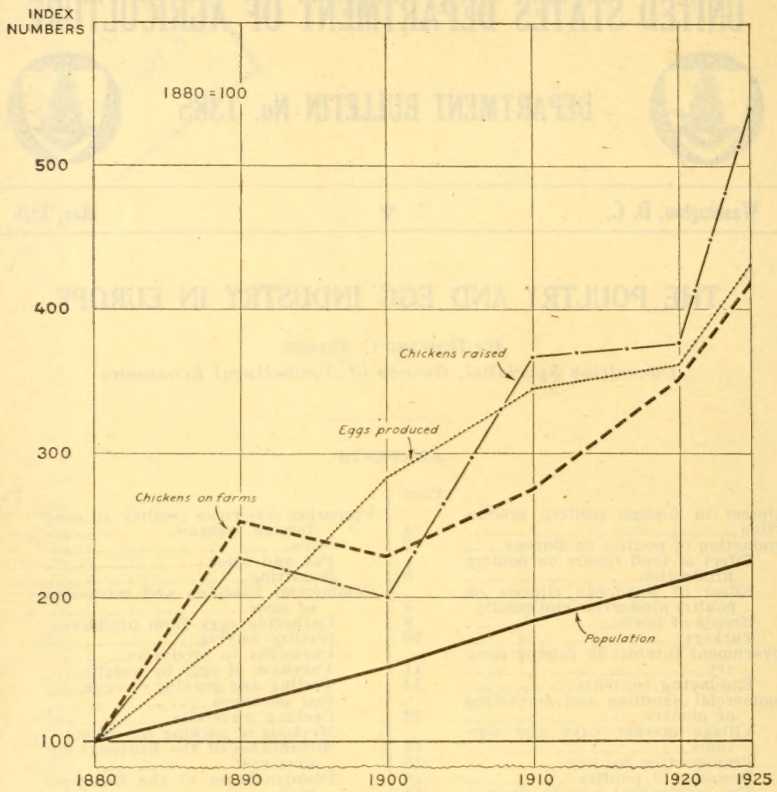

FIG. 1.—Comparison of increase in human population, chickens raised, and eggs produced in the United States, 1880–1924

TABLE 1.—*Production of eggs, number of chickens raised and on hand, and population of the United States, with rates of increase, census years 1880, 1920, and 1925* [1]

Year	Eggs produced [2]	Chickens raised [2]	Chickens on farms [2]	Population United States	Index numbers (1880=100)			
					Eggs produced	Chickens raised	Chickens on farms	Population United States
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
1880 (June 1)	5,482,931	125,507	102,272	50,156	100.00	100.00	100.00	100.00
1890 (June 1)	9,836,675	285,609	258,871	62,948	179.41	227.56	253.12	125.50
1900 (June 1)	15,523,949	250,624	233,566	75,995	283.13	199.69	228.38	151.52
1910 (Apr. 15)	18,899,753	460,611	280,341	91,972	344.70	367.00	274.11	183.37
1920 (Jan. 1)	19,848,539	473,302	359,537	105,711	362.01	377.11	351.55	210.76
1925 (Jan. 1) [3]	23,619,312	678,300	427,000	112,786	430.78	540.45	417.50	224.87

[1] Compiled from annual reports of Bureau of the Census, except as otherwise stated.
[2] Production figures are for the preceding year.
[3] Data for 1925 compiled from estimates published in United States Department of Agriculture. Number and value of livestock, Jan. 1. *In* Crops and Markets, vol. 2, sup. 2, p. 44. 1925.

TABLE 2.—*Eggs: Exports from the United States by countries, 1906 to 1924*[1]

Year	United Kingdom	Canada	Panama	Mexico	Cuba	Argentina	Other countries	Total
Year ended June 30:	*Dozens*	*Dozens*	*Dozens*	*Dozens*	*Dozens*	*Dozens*	*Dozens*	*Dozens*
1906	182,570	425,648	113,380	776,271	3,275,391	----------	178,803	4,952,063
1907	2,770	742,220	288,027	941,807	4,889,701	----------	104,460	6,968,985
1908	197,720	1,159,626	553,225	930,775	4,682,950	----------	66,681	7,590,977
1909	7,275	866,609	591,374	631,194	3,055,706	----------	54,993	5,207,151
1910	910	868,454	591,673	585,540	3,220,037	----------	59,322	5,325,936
1911	2,330	2,457,188	848,667	668,022	4,499,211	----------	83,294	8,558,712
1912	58,470	8,697,568	791,065	776,459	4,990,958	----------	91,089	15,405,609
1913	51,055	12,856,690	818,470	847,615	5,721,200	1,500	112,860	20,409,390
1914	6,001	9,064,948	794,286	485,842	5,651,261	----------	146,511	16,148,849
1915	7,395,143	6,116,988	621,250	143,693	5,290,945	955,234	261,171	20,784,424
1916	8,255,909	7,916,534	852,960	447,818	8,046,128	567,173	309,684	26,396,206
1917	4,359,192	10,850,678	849,508	1,170,450	7,447,257	24,330	225,009	24,926,424
1918	3,679,795	5,216,179	681,921	1,301,495	7,996,499	60	93,218	18,969,167
1919	12,330,488	3,091,982	737,830	2,091,073	9,804,376	----------	329,034	28,384,783
1920	11,521,631	11,014,980	618,065	1,521,573	12,402,771	----------	1,247,966	38,326,986
1921	1,797,814	6,123,770	731,533	3,594,155	14,596,671	----------	116,155	26,960,098
Calendar year:								
1921	3,981,419	7,350,732	831,105	5,936,196	15,015,726	----------	176,109	33,291,287
1922	4,339,340	8,563,314	806,487	9,071,306	11,454,352	31,800	353,451	34,620,050
1923	3,452,111	7,027,743	985,603	5,835,443	12,205,584	740,100	412,678	30,659,262
1924	1,154,635	4,780,060	910,930	5,848,032	13,080,680	1,881,710	461,055	28,117,102

Compiled from United States Department of Commerce, Bureau of Foreign and Domestic Commerce; foreign commerce and navigation of the United States, 1906-1921, and from United States Department of Commerce, Bureau of Foreign and Domestic Commerce: monthly summary of foreign commerce of the United States, supplemented from official office records of the United States Department of Commerce, Bureau of Foreign and Domestic Commerce.

When our production finally exceeds domestic demand it will be necessary for us to look with increased attention to foreign markets as an outlet for the surplus. We are already exporting considerable quantities of both poultry and eggs (see Table 2), and as the European financial conditions continue to improve the demand for our products should increase.

American producers, packers, and merchants of both poultry and eggs are, therefore, interested in poultry and egg conditions throughout the world. They are especially interested in Europe because at present Europe, with its large consuming population, seems to offer a satisfactory outlet for our surplus production, particularly in the case of dressed poultry.

From a competitive standpoint we are interested in the present and potential production of poultry and eggs in Europe and in the methods of handling and sale of poultry and eggs in foreign markets as affecting their quality and their production costs. We are interested in the per capita consumption of poultry and eggs by the people of the various countries and the possibilities of increasing it. We must know the market requirements of Europe in both poultry and eggs that we may determine how to prepare our own products for export.

PRODUCTION OF POULTRY IN EUROPE

The production of poultry in Europe is limited or stimulated by various factors, such as size and kinds of farms, climate, and customs.

EFFECT OF LAND TENURE ON POULTRY PRODUCTION

In the large poultry-producing areas of the United States farmers live on the land. Their homes, barns, and outbuildings are situated in the midst of or adjacent to the cultivated land. The fields and

pastures are usually large and surrounded by fences. Cows, sheep, hogs, and other farm animals can wander within their respective inclosures without fear of trespass on growing crops, but poultry

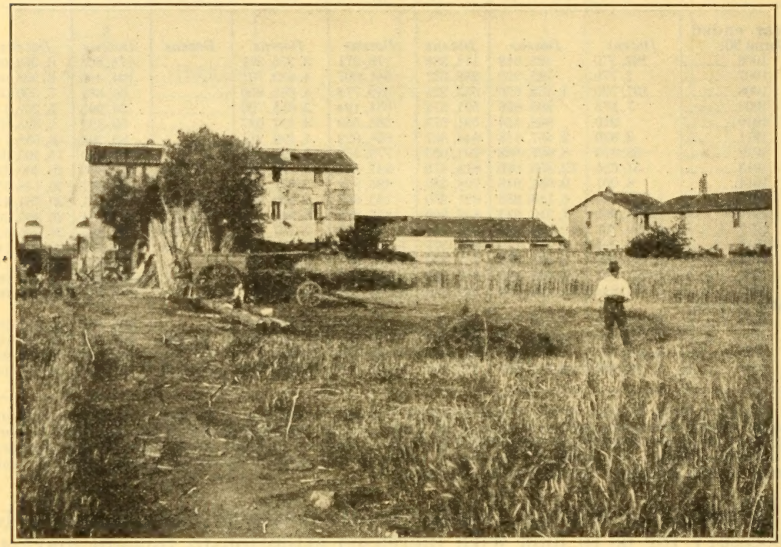

FIG. 2.—Farm home in central Italy as seen from the fields. These buildings house 20 families with their livestock and implements

often wanders unconfined where it will. The number of head of poultry kept is determined largely by the interest of the farmer in poultry, cheapness of the feeding stuffs consumed, or the market quotations of the poultry and eggs produced. Our poultry popula-

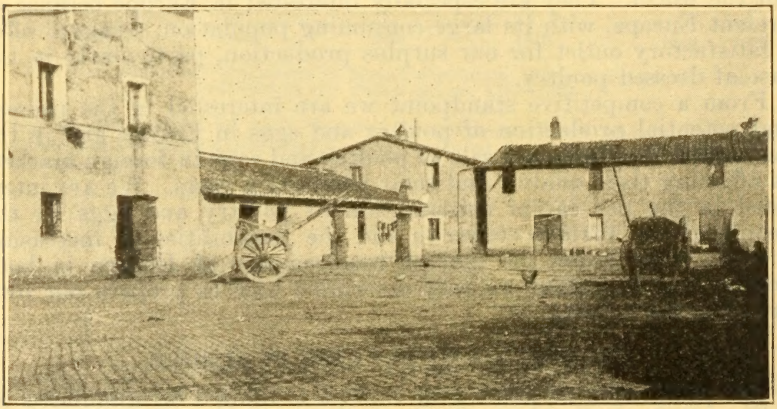

FIG. 3.—Courtyard of farm home shown in Figure 2. In ground floors of buildings are stalls for horses, cows, pigs, and chickens. Wagonload of manure at right

tion could be increased two, three, or more times without sensibly affecting the relationships of poultry to other farm animals or other farm activities. These conditions obtain, although to a much less

extent, in certain parts of northern Europe, as the British Isles, Denmark, northern Germany, the Netherlands, and Belgium. In Great Britain the fields are carefully hedged. Denmark has both hedges and fences. In these countries the people live on the land they work.

In southern and central Europe, on the other hand, the system of agriculture is often such as to limit the amount of poultry that can be raised per farmer. Here the farmers live together in villages. Each farm home consists usually of a hollow square, one side of which opens on the village street. The walls of this hollow square are formed by stables for the horses, cows, and pigs, by sheds for implements, and by the dwelling quarters of the farmer and his family, and his labor, if any is hired. (See figs. 2 and 3.) The courtyard itself contains the well, farm machinery, and that significant evidence of prosperity, the manure pile. The size of the manure pile indicates the number of livestock kept and the acreage that can be fertilized, and therefore the approximate wealth of the individual farmer.

The walls along the village street often form a continuous barrier perforated only by gateways that open into the courtyards. Roughly speaking, the people of Europe seem to live inside out as compared with American ways. The European house, built as it usually is facing a courtyard, presents a blank wall to the outside. The courtyard is the center of activities.

As the farmers usually live in villages, the farm lands may be several miles away. The acreages of the farms are much smaller than in the United States and one man's holdings may be widely scattered. It is not uncommon for a farmer to own six or more pieces of land situated in various directions from the village, the whole area totaling only 15 acres. These pieces of land are usually long and narrow. In some cases they may be from 50 to 100 feet wide and from 600 to 1,000 feet long. There are no fences or hedges to separate them from adjacent fields. Ordinarily the only noticeable line of demarcation between lands of different tenure is a ditch, a furrow, or the change from one kind of crop to another. Such countries as Czechoslovakia, Poland, Austria, France, and northern Italy have a variegated country landscape full of alternating fields of grain, alfalfa, beets, potatoes, vineyards, or other crop combinations. (See fig. 4.)

Lack of concentrated holdings by one owner, distance of the fields from villages, and absence of fences prevent the raising of any animals that can not be herded or tied while on pasture or maintained within the confines of the farm buildings. Therefore in these sections of Europe where this "strip" farming prevails the only poultry that can be kept outside of the villages is geese. Geese may be herded. The geese of an entire village are pastured under the care of children or old women on the commons and along the watercourses adjacent to the village, or on the stubble land of the owners in proportion to their part of the community flock. It is an interesting sight to see the gooseherds gather up the flocks from the several courtyards in the village, drive them to the pastures, and return with them at night. The various geese know their own courtyards, and as the procession passes through the village each

turns off into his own doorway. During the summer, when the areas of goose pasture are large, the flocks are kept on pasture day and nights for months without the return to the village.

The number of other fowls that can be kept under this village and "strip" system of farming appears to be limited, therefore, to the

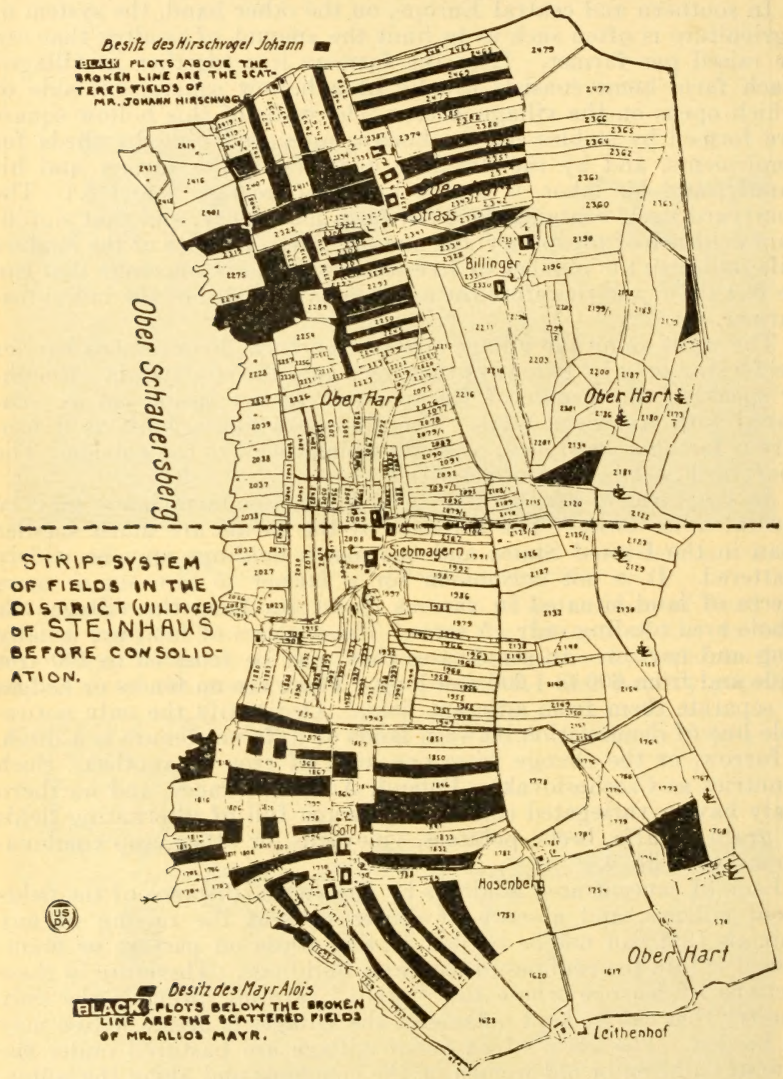
Besitz des Hirschvogel Johann
BLACK PLOTS ABOVE THE BROKEN LINE ARE THE SCATTERED FIELDS OF MR. JOHANN HIRSCHVOGEL
Ober Hart
Strass
Billinger
Ober Schauersberg
Ober Hart
Ober Hart
Siebmayern
STRIP-SYSTEM OF FIELDS IN THE DISTRICT (VILLAGE) OF STEINHAUS BEFORE CONSOLIDATION.
Hasenberg
Ober Hart
Leithenhof
Besitz des Mayr Alois
BLACK PLOTS BELOW THE BROKEN LINE ARE THE SCATTERED FIELDS OF MR. ALIOS MAYR.

FIG. 4.—Plan of typical central European farming community

sizes of the courtyard and the stables. The average poultry kept per farm under these conditions generally is stated as being from 15 to 40 head, with but little chance of increase. In Poland, for example, the average number of poultry per farm is estimated at 15 head, with no possible chance of increasing beyond 30 head per farm. As a result of these limitations the aim of the poultry organization

society of Poland is to increase the average poultry per farm to 30 head and increase the production per laying hen from 70 to 100 eggs per year.

EFFECT OF EUROPEAN CLIMATE ON POULTRY PRODUCTION AND QUALITY

It may be safely stated that if Europe, especially northern Europe, had the same ranges in temperature as the central United States, at least 10 per cent of their eggs and 50 per cent of their dressed poultry as now handled during the summer would spoil before they could be marketed.

In the United States the January mean temperatures range from 10° to 30° F. in the extreme northern section, 30° to 50° in the central sections, and 50° to 60° in the far southern sections. In Europe, on the other hand, the January temperatures average from 30° to 50°, with the exception of Russia, which is much colder.

The July temperatures in the central United States, the section of greatest poultry and egg production, averaged from 70° to 90° F. The corresponding temperatures in northern Europe are from 50° to 70° and in southern Europe, below a line drawn through northern Italy and upper Yugoslavia, the corresponding temperatures are from 70° to 80°.

When it is considered that 68° F. is the temperature at which a fertile egg will commence to develop an embryo, even though it subsequently dies, and that at a temperature of 90° blood will form in a fertile egg in three days, thus rendering it unfit for food, these temperature figures become especially important. They show that in the egg-producing centers of the United States, during the summer months the average temperatures are not only continually above the physiological zero of the egg (68° F.) but vast areas have temperatures ranging 90° and above, resulting in the rapid spoiling of fertile eggs. The larger portion of continental Europe, however, has an average temperature of 50° to 70°, exceeding the physiological zero by only 2°, at which temperature germinal development is very slow. Even in southern Europe the maximum average temperature of 80° is 10° less than that of the central and southern United States.

These lower summer temperatures explain why it is possible for the Europeans to gather and ship their eggs in the summer without refrigeration. They also explain why it is possible for poultry to be dressed in northern Europe, cooled without refrigeration, sold on the market without additional cooling, and reach the consumer in fair condition within three or four days after killing.

The climate of Europe also indirectly affects the number of poultry produced in the same manner as it does the poultry production of the United States—that is, through its influence on the production of corn. In the United States the poultry production is the heaviest where the corn production is the greatest. The same thing holds true in Europe. The largest exporting poultry section of Europe is the lower Danube Basin, including parts of Austria, Hungary, Yugoslavia, Bulgaria, and Rumania, and adjacent Russian territory. This is also the main corn-producing section of Europe, as corn is not produced to any extent in any other section, except in small areas in northern Italy and southern France. Corn is produced only in

areas where there are warm nights, long growing seasons, and adequate rainfall. Thus, we may expect that the exportable poultry surplus in Europe will continue to come mainly from the lower Danube Basin and Russia.

The egg supply will probably also increase in this area and in the sections of Europe adjacent to the large markets, such as Denmark, Netherlands, Germany, Belgium, France, and Ireland. In these countries interest in the keeping of poultry for egg production is developing more and more rapidly, and the flocks of poultry can be expanded even though a large part of the feed supplies must be purchased from abroad.

BREEDS OF FOWLS

As in the United States, there are a great number of different breeds and varieties of fowls in Europe, but the distribution of the different breeds is much more localized than in this country. Many countries have breeds which are peculiar to them. Other countries have breeds which are peculiar to particular sections in that country.

Often some of the breeds which are peculiar to a certain country are apparently of much less economic value than breeds in even adjacent countries. This seems to be specially true in the new countries whose boundaries have been created since the war, and is but a reflex of the intense nationalistic feeling in these countries. Their strong determination to maintain their national independence in every detail is carried perhaps even so far as to be a detriment, as, for instance, in the case of perpetuating the Polish "Greenfeet" breed. This breed is exceeded by many others in utility value, but because it is different from that found in other countries and is more or less adapted to its habitat, it is adopted as a national breed.

On the other hand, certain breeds are kept which are not only local in habitat but are highly specialized and adapted to their ultimate value as meat or egg producers. Among these are the Malines in Belgium, the LaFleche and LaBresse in France, the Sussex and Dorking in England, which are essentially meat breeds; the Campine and Braekel in Belgium and the Leghorns in Italy, which are essentially egg breeds; and the Barnevelder, which is being developed in the Netherlands because of the very deep brown color of its eggs. It also has a large body, which enables it to be classed as a meat breed.

Other breeds are spread generally over Europe without respect to country. The most extensively distributed are the Leghorns or crosses of the Leghorns, which are usually called "Italian fowl" rather than Leghorns. These Mediterranean breeds are responsible for the white eggs produced in Europe.

Certain of the American breeds of poultry are well known in Europe—Rhode Island Reds, Barred Plymouth Rocks, and Wyandottes. The Rhode Island Red apparently stands higher in favor than the other American breeds. For instance, when the question was asked in France, Spain, Italy, Czechoslovakia, and other countries as to which breed of poultry is best adapted to that particular country, the answer was always the breed which is more or less a product of that country, and the second choice was the Rhode Island Red. No definite reason could be ascertained for this preference except that this breed seemed to do well in the few experiment stations and fancy poultry breeding establishments that exist in continental Europe.

The Barred Plymouth Rock is not appreciated in continental Europe as it is in America. This is doubtless because most of the stock called Plymouth Rock is of a strain that has been bred in Germany. It is undersized, seems to have poor vigor, very poor egg production, and a much lighter color than the American type of Barred Plymouth Rock. Barred Plymouth Rock stock which is obtained direct from America shows its usual characteristics of large size, sturdiness, and good egg production, and reproduces these characteristics in its offspring. Although doubtless descendants of importations from the United States, the German Barred Rocks, due to faulty management and possible crossing with other breeds, are now usually but a poor imitation of the American variety.

The Wyandottes are much less known than the other two American varieties and are almost all descendants of English Wyandottes.

The heavier breeds of poultry, such as the Orpingtons, Sussex, Malines, La Bresse, and La Fleche, are plentiful in the British Isles and northwestern Europe; but the Mediterranean type of chicken predominates in the remainder of Europe, with a slight exception in the territory which constituted Hungary before the World War and which now includes the present-day Hungary and contiguous portions of Czechoslovakia, Rumania, Yugoslavia, and Austria.

Before the war it was the policy of the Hungarian Government to purchase males from heavy breeds of chickens, such as Barred Plymouth Rocks, Wyandottes, and Orpingtons, and exchange them for the mongrel males in various villages. This exchange was made, village by village, and the mongrel males were replaced entirely in each village. The results of this policy, unfortunately discontinued since the war, are still evident, as the flocks of country chickens in northern Yugoslavia and Hungary show evidences both in size and color of the results of these crosses. It is probably due to governmental activity that Hungarian poultry is now considered to be the best in central Europe.

The different European breeds are distinct and easily recognized, but not so much attention is paid to breeding in accordance with definite standards as in the United States. Nearly all of the poultry on the farms of Europe show evidences of mongrel blood, and even where they are bred in greater or less accordance with definite standards uniformity of color and type is often lacking.

BEST-KNOWN BREEDS

The breeds of chickens which are generally unknown in the United States, but which are the leading or most highly recommended in their respective countries, are given as follows:

Poland: *Greenfeet.*—Varieties: Partridge, Light, Dark Buffs, Blacks, and Grays.[1]

Weight of adult hens, 3 to 4 pounds; a small Leghorn type of fowl with white skin, red ear lobes, and green shanks, feet, and toes. Eggs white, slightly tinted, small, weighing about 22 ounces per dozen. Production claimed, 100 to 200 eggs per year.

Czechoslovakia: "Green Legs."

Weight, 3 to 4 pounds. Small Leghorn type of fowl with white skin, red ear lobes, and greenish shanks, single comb. Eggs white, slightly tinted, small,

[1] Karczevska, M., The Polish Greenfeet hens. *In* Trans. First World's Poultry Cong., 1921. Vol. 2, p. 159. 1921.

about 22 ounces per dozen. Production claimed, 180 eggs per year. This is practically the same chicken as the Polish Greenfeet, except that it is being bred with Brown Leghorn color. Polish and Czechoslovakian poultry breeders accuse each other of pilfering this breed. Each country claims it for its own.

Belgium: *Malines.*

Two breeds, one of medium size, the adult hens weighing 4 to 5 pounds, with single comb; one in which the adult female weighs 10 to 12 pounds, with pea comb. Both breeds have feathered legs, white skin. Divided into several different varieties, according to color, the most prevalent being the Coucou, grayish and black barred. Eggs are brown, large, weighing from 24 to 28 ounces per dozen. Production claimed, 120 to 160 eggs per year. Kept for meat production especially.

Campines and Braekels.—The adult hen, campine, weighing about 3½ to 4 pounds; Braekels, 4½ to 6 pounds. White skin, single or rose comb, color golden or silver barred and penciled. Eggs white, good size, 24 to 26 ounces per dozen. Production claimed, 150 to 225 per year. Kept for egg production. Make especially good broilers when sold at three-quarters pound each.

Hungary: *Hungarian or Magyar.*

Small size, weight of adult females 3 to 4 pounds. Yellow skin and shanks. Eggs medium in size, averaging 22 to 23 ounces to the dozen. Production claimed, up to 150 eggs per year. Varieties: Black, Yellow, White, and Speckled; not bred to a very definite general type. Had been used as the basis for crossing with imported cockerels of heavier breeds under Government supervision prior to the war.

Naked Necks.—Medium size, 4 to 5 pounds for adult hens; white skin, with lead-colored shanks. White and various colored varieties. Eggs white, fair size, about 23 ounces per dozen. A plump, well-rounded body, the distinguishing characteristic being a featherless area of about 3 inches on the neck, the skin of which is red, probably because of sunburn. Egg production about 150 eggs. This breed has the reputation of being the most hardy breed in eastern Europe.

Spain: *Castellan.*

Medium size, weight 4 to 5 pounds for adult females; black color, single comb, bluish-white skin, lead-colored shanks. Size of eggs, medium; weight, about 22 to 23 ounces per dozen. Production claimed, up to 200 eggs per year. This breed is closely related to the Minorca, although very much smaller than the American type of this breed.

Prat.—Medium size, weight 4 to 5 pounds for adult hens; white skin, slatish-colored shanks. Varieties: Buff, White, and other colors. The eggs white, good size, 24 to 25 ounces per dozen. A very hardy bird and rather widely distributed in the western part of Spain.

France: *LaBresse.*

Medium size, weight 4½ to 5½ pounds for adult females, white skin, bluish gray shank. Varieties: Gray, Black, White, and other colors. Eggs white, good size 24 to 25 ounces per dozen. Kept mainly for fattening for meat production and to produce the celebrated LaBresse fowl either pure or through crossing. Production about 150 eggs per year.

LaFleche.—Large size, adult females 6 to 8 pounds, skin white, legs dark slate or black, color black, comb consisting of two red horns, distinctive to the breed. Eggs white, good size, weighing 24 to 26 ounces. Production about 140 eggs per year. Kept almost entirely for feeding for meat production or for crossing on other varieties to improve their meat quality.

TURKEYS

The raising of turkeys in Europe in large numbers is confined to Hungary, Yugoslavia, Rumania, and parts of Russia, although there are small scattered productions in France, Poland, Italy, and other sections. As with fowl, the largest number of market turkeys is produced in the corn-growing areas. The European turkey is descended from the same stock as the American domesticated turkey—the wild Mexican turkey—but the size is inferior to that produced in the United States.

Turkeys from the Danube Valley are killed only in the fall, when the weather is suitable for cooling them without artificial refrigeration. They are dressed by bleeding from the throat, are dry-picked and packed in boxes for shipment to a large consuming market, like Berlin, Hamburg, Paris, London, Liverpool, or Manchester.

GOVERNMENT INTEREST IN RAISING POULTRY

Most of the ministries of agriculture in Europe have at least one poultryman and often a staff; but poultry investigations, instruction, and demonstrations as understood in the United States do not exist in Europe. The most extensive investigations and instructions now being carried on are doubtless in England, where through the

FIG. 5.—A Danish Government poultry experiment station near Copenhagen

efforts of the National Poultry Organization Society and the Poultryman to the Ministry of Agriculture, a system of district or county poultry advisers has been developed and a national poultry institute has been established in connection with the Harper-Adams College of Agriculture. Besides their activities, scientific research is carried on at Cambridge University along breeding lines.

Denmark has an able educator as poultry councilor. In collaboration with the cooperative poultry organizations and the ministry of agriculture he has developed a system of breeding centers consisting, in brief, of a flock of standard-bred poultry which is carefully and continuously trap nested. (See figs. 5 and 6.) The eggs are sold to poultry producers at fair prices considering the quality. This project has increased egg production and the interest in the raising of poultry to the extent that Denmark's exports of native-produced eggs have almost doubled within the last five years.

The Netherlands does similar work and perhaps even more extensively. Probably the investigation of poultry diseases from the standpoint of service to the poultrymen is better developed in the Netherlands than in any other country, not excepting the United States. The Government maintains a pathological laboratory and serum institute at Rotterdam in which the director, with assistants, devotes his entire time to poultry diseases. Sick and diseased poultry from all over the country are continually coming to this laboratory for diagnosis and suggestions for treatment. This service is free.

Italy conducts classes in poultry management at the Royal School of Agriculture, adjacent to Rome. Poultry investigations are con-

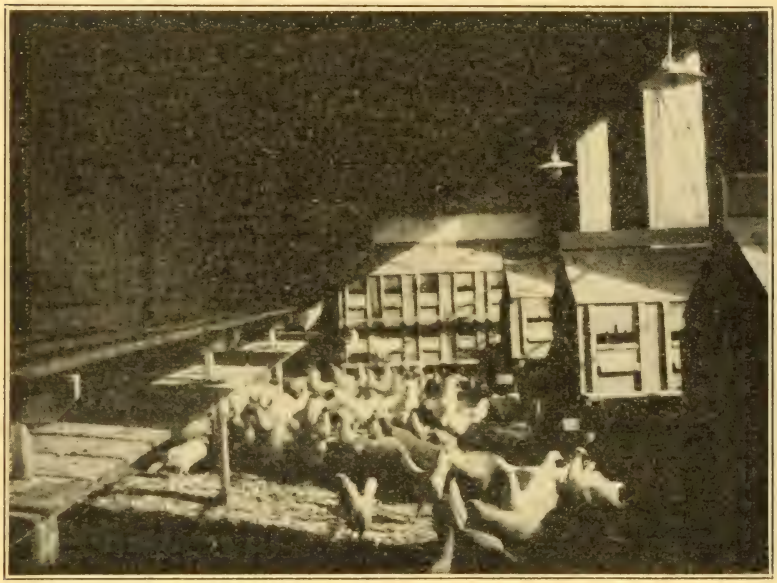

FIG. 6.—Trap nest in laying house in Danish poultry-breeding center

ducted in a poultry experiment station at Rovigo, at Milan by the director of the Royal Veterinary School, and at the Royal Veterinary School at Portici, near Naples.

Scientific work in poultry and eggs conducted in Europe bears much less relationship to the practical problems of the producers than in this country. The scientist apparently works for the interests of pure science without respect to the application of his results to practical conditions. In fact, there seems to be but little in common between the scientist and the practical man. There is greater harmony of interest between the scientist and the practical man in England, Denmark, and the Netherlands than in the rest of Europe; but, even in these countries, the relation between the scientist and the producer is much less evident than it is in the United States.

EGG-LAYING CONTESTS

Egg-laying contests are carried on under Government auspices in the British Isles, France, Denmark, and Austria (fig. 7). England has egg-laying contests for ducks which have attracted wide attention, because of the large individual egg production obtained. Ducks producing 300 eggs a year are fairly common. The combination of egg-laying contests and breeding centers for production of high-producing stock seems to be the most practical and least costly way of improving the production of the breeds. Centers for the breeding of strains of fowl of large productivity are most extensive in Denmark. They are operated by private individuals under Government supervision. All hens in these establishments are trap nested and carefully mated. The eggs for hatching and stock for

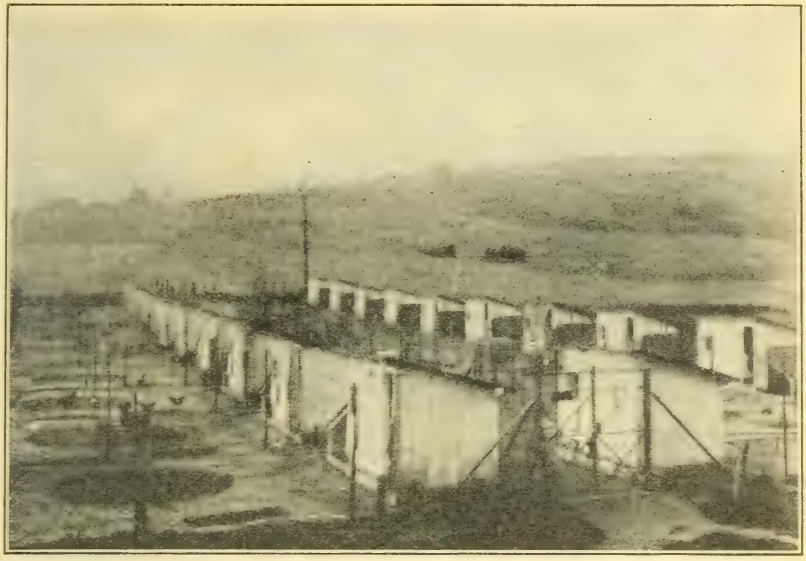

FIG. 7.—Scene of egg-laying contest at Wettelschopf, Vienna, Austria

breeding purposes are sold at reasonable prices, as determined by the Government. Each breeding center has but one variety of poultry, those most generally kept being Brown Leghorns, White Leghorns, and Barred Plymouth Rocks. The number of breeding birds kept at each center varies from 200 to 400.

COMMERCIAL HANDLING AND MARKETING OF POULTRY

There are practically no large poultry and egg farms in Europe nor any centers where eggs are produced in such large quantities as in some points on the eastern and western coasts of the United States. Only a small number of poultry is kept by the farmer; and, because it is largely kept in the villages, the method of gathering eggs from the farm varies somewhat from that existing in the middle western and southern portions of the United States. In those sections of

Europe, however, where the farmers live on the farms the poultry-gathering methods are similar to those followed under the same conditions in this country. Hucksters go from farm to farm (fig. 8), gather the poultry in crates or baskets, pay for it as gathered, and take it to country dealers, who concentrate it in large numbers for shipment to market in coops or in carloads.

In the thickly settled portions of Belgium, the Netherlands, England, France, and Germany there is a much larger percentage of direct selling than in this country. The farmers themselves may take the birds to an open market and sell them direct to the consumer, or the huckster who buys from the farmer may take them direct to the large market and sell them to a wholesaler, or he may sell them in his own stalls on the public market, or, as is prevalent in southern Italy, the huckster may peddle them from house to house.

FIG. 8.—Huckster wagon in northern Italy. Eggs in boxes; chickens in crates

In Denmark most of the eggs are gathered by collectors of cooperative societies or private dealers and are paid for by weight at a price set at the beginning of the week.

VILLAGE MARKET DAYS AND AUCTIONS

Because the poultry and egg production is often localized in villages, a system of village market days has been developed in certain sections of Europe. These markets occur usually on a certain day of each week. The villages may form, as in southern Italy, a circuit of market days, one village having Monday, the next village Tuesday, and so on throughout the week. At these village sales the larger buyers bargain direct with the villagers for their produce or

bid for it in open auction, depending upon the system in vogue in the particular village. The auction system of selling is probably best developed in the Netherlands as the result of cooperative producers' organizations, and in portions of England, where it is in the hands of private auctioneers.

TRANSPORTING POULTRY

The coops and crates used for the transportation of poultry from farm to dealer vary widely in various sections of continental Europe. In Spain, France, Italy, and Yugoslavia, a crate similar to the wooden rod coop used in the United States is generally used (fig. 8). Instead of being machine-turned, the rods are usually split by hand from tough wood. In Spain a double-deck coop is often used. This coop is about twice the height of the American coop, with doors on the sides and a middle floor of woven withes. In other sections, such as southern Italy, northern France, and the Netherlands, woven splint or willow baskets are used for the transportation of live poultry. These baskets may be square or round, and are about 2 feet square or in diameter. The tops of the baskets are closed by a lid of coarsely woven netting, similar to fish net, or of willow withes. In Italy the fish net is often supported above the top of the basket by curved strips of wood forming a dome over the basket (fig. 9).

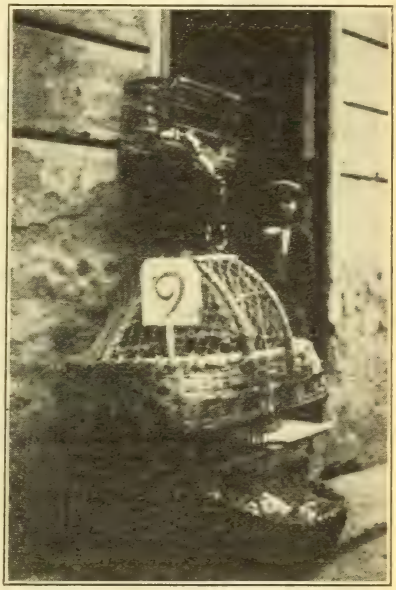

FIG. 9.—Poultry in baskets, retail market, Naples, Italy

The huckster brings in the poultry and eggs on oxcarts and horse-drawn or dog-drawn wagons. Little, if any, country hauling is done by automobile truck.

Cars specially designed for the trade are used extensively for the transportation of poultry from the Danube Basin to northern Italy and Germany. These cars are owned by large dealers who operate buying stations or who have trade relations with large buyers in Hungary, Rumania, Yugoslavia, Bulgaria, and formerly, Russia. The cars may be slatted and contain ordinary chicken coops, or they may be especially equipped for the purpose. They are very different from the commonly used poultry car in the United States.

A live-poultry car such as used between Yugoslavia and Italy has slatted sides, ventilated roof, and is divided into compartments similar to the old-style European passenger coach (fig. 10). There are four of these compartments extending crossways of the car, the doors of each section opening from the sides of the car. A little cabin that projects from one end provides a place for the attendant

to stay while the train is in motion. No aisle runs lengthwise of the car, and it is impossible for the attendant to feed the poultry except when the train is at a standstill; and, as the cars are not equipped (fig. 10) with water tanks, no water can be given except when the train is at a station. The capacity of the cars when divided into cross sections is approximately the same as it would be if they were divided longitudinally. The coops in which the poultry is confined within this type of car are often made entirely of metal, with feeding troughs hung on the front of the coop. Each car holds 3,500 chickens, weighing in the aggregate approximately 8,000 pounds.

Under these conditions, together with the feeds used, consisting mainly of corn, wheat, barley, and water, the shrinkage of poultry

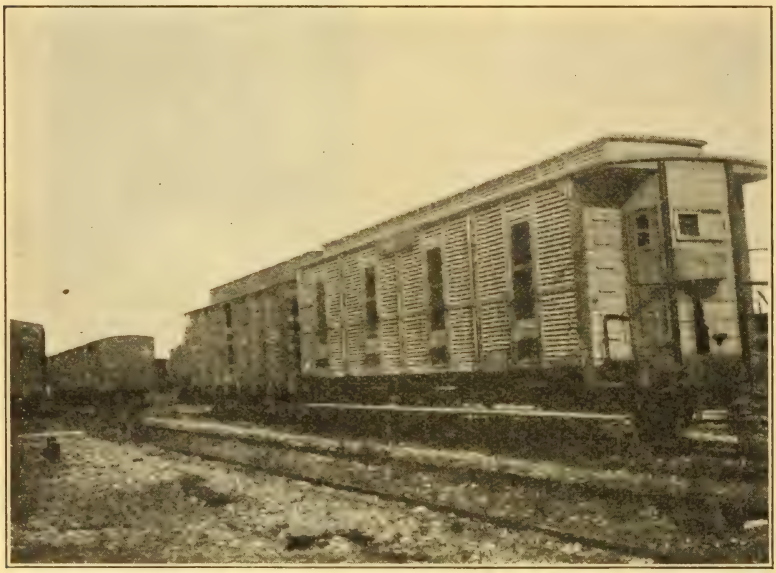

FIG. 10.—Live-poultry car used between Yugoslavia and Italy. Hungarian live-poultry car in rear

in transit is large. The estimated shrinkage from southern Yugoslavia to Milan, Italy, a period of something like seven days in transit, averages as high as 15 per cent of the live weight.

DRESSING OF POULTRY

In the United States the customary way of dressing poultry for market is to bleed it, remove the feathers, and cool it by artificial refrigeration or by ice, pack it without removing the entrails, and ship it to market or cold storage in refrigerator cars.

In Europe the poultry is killed, picked, and entrails drawn immediately. It is packed in baskets or boxes, usually with straw, after cooling during only one afternoon or night at ordinary temperatures. The drawing of the poultry helps to cool the carcass by removing the heat in the entrails. Of course, this removing of the entrails contaminates the abdominal cavity with intestinal con-

tent, to say nothing of exposure to infection from the finger of the dresser or exposure to the air. The drawing is necessary, however, to remove the heat and allow for the more rapid cooling of the carcass without refrigeration. On the other hand, the drawing prevents the birds from being satisfactorily stored without subsequent decomposition during sale in the market.

In some instances, especially in Yugoslavia, Hungary, and the Netherlands, paper is crowded into the abdominal cavity. The reasons given are that it seals the end of the broken entrails, distends the cavity so that cooling is more prompt, and improves the appearance for sale. It is doubtful if the exposed orifice of the intestine is

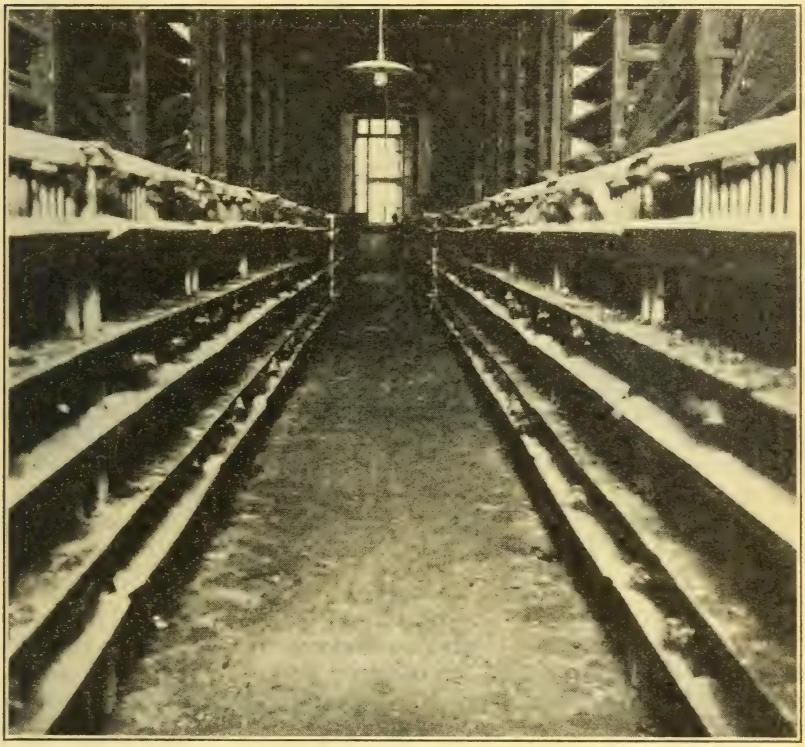

FIG. 11.—Interior of feeding station, Codogno, Italy

sealed, but there perhaps is some slight advantage in that the paper may act as a blotting medium and absorb the excretions. It is probably true that the bacterial content of the flesh of American chickens, prepared in the American way and shipped frozen to London, is much less than that of the native-dressed poultry, as ordinarily displayed on the London or other European markets.

POULTRY-DRESSING PLANTS

Poultry-dressing plants equipped for the feeding, dressing, cooling, packing, and shipping of dressed poultry, common in this

country, are practically unknown as yet in Europe. In northern Italy, at Codogno, is a feeding and dressing station having a capacity of about 10,000 birds. It is not equipped, however, with artificial refrigeration (Fig. 11). Hungary and Yugoslavia each has one dressing plant equipped to feed about 10,000 birds, and to kill, cool, and pack similar to the American methods, although their efficiency of operation has not reached the average American standard.

Feeding and dressing of poultry by the farmers and small feeders in England, Belgium, and France is much more extensive than anything known in the United States, and the finest quality dressed poultry produced in Europe is the farm-fattened and farm-dressed fowls in England, Belgium, and France. The practices used by the larger plants and the farm methods are so widely variant that it is well to discuss each of them somewhat in detail.

FIG. 12.—Buildings used in poultry feeding station, Subatica, Yugoslavia. The feeding crates are arranged in aisles inside the building

THE CONTINENTAL POULTRY PLANT

FEEDING

A description of the methods used in one of the continental poultry plants is typical of the others known to exist. The poultry on arrival at this plant is placed in feeding batteries made entirely of wood, similar to the old-type wooden batteries used in this country (fig. 11). The sections are about 6 feet long, 20 inches deep, and 18 inches high. The slats on the front are vertical. The feeding trough is of wood, V shaped, and is supported by notched boards at each end. The bottom of the crates is slatted, the droppings being caught upon boards placed underneath. These dropping boards are cleaned once a day and are kept covered with about one-fourth inch of loam. The crates themselves are stacked one above the other, from four to seven crates high. A stepladder is required to feed the birds in the upper crates. Each crate contains from 8 to 12 birds, depending upon their size.

The feeding crates are placed in a shed or large room and maintain their position through the feeding season (fig. 12). Batteries

on casters or crates on movable trucks are unknown. It is necessary that the birds, on receipt at the plant, be taken from the coops, placed in the feeding batteries, then, after feeding, be removed from the batteries into coops again and taken to the killing room.

The feeds used are a mixture of coarsely ground corn and oats or barley, hand mixed with water into a stiff paste, which is allowed to stand for 12 hours before feeding. The birds are fed twice a day all that they are able to eat of this mixture. The whole station has a capacity of about 12,000 head. Although there is no undue death loss in this method of feeding, neither is there any appreciable gain. As a matter of fact, one operator said that his poultry always weighed less when it was taken out of the crates than when it went in. The only reason given for feeding was that the feeding period made the flesh tenderer and more even in color. The appearance of the birds after dressing indicates malnutrition, as the breasts are sharper and the bodies less well filled out than is expected even in the ordinary dressed poultry prepared in the United States, although the smaller or broiler sizes of these birds are being prepared for export to the United States. The larger sizes are sold in continental Europe.

DRESSING

In the killing room the birds are hung by the feet, killed by cutting the throat, allowed to bleed, and all the feathers are removed by women and children. The feather picking is an unduly laborious process, as the birds are often nearly cold before the feathers are taken off. The technique of bleeding and sticking the brain to release the feathers, commonly practiced when poultry is dry-picked in the United States, is not practiced. The intestines are removed by inserting a finger in the vent and pulling them away from the gizzard. The abdomen is then stuffed with paper until distended to original size. In some plants the birds are killed by inserting small scissors in the mouth and snipping the veins at the base of the skull; in others the throat is cut from the outside.

COOLING AND PACKING

After dressing, the birds are placed loosely in shallow boxes, about six to a box, and each box is carried to the refrigerated cooling rooms and placed on the floor. They are allowed to cool overnight at approximately a freezing temperature or a little below, and are packed more closely into boxes the next day. As few sizes of boxes as possible are used. The number of the birds placed in a box varies in accordance with their size, the numbers and weights being marked on the outside of the box. It is probable that these methods of packing will be so changed as to have a standard content of 12 birds to the box, the size of the box varying to fit the varying sizes of the poultry.

Compared with the United States, the amount of labor involved is enormous. Extra labor is incurred in every department of the operations—feeding station, killing room, and packing room. It is apparent either that the labor item is not considered or that it is considered that improved methods to save labor would not warrant the cost of the investment.

After packing, the poultry is frozen and loaded into cars for shipment. The transportation, however, must be done without ice, as there are practically no refrigerator cars in Europe. This lack of refrigerated transportation means that poultry is mainly dressed during the fall, when the weather is cold enough to allow them to be transported without spoiling. This natural refrigeration has been taken advantage of to the extent that one concern, at least, routes its cars of dressed poultry to western Europe by way of the Swiss Alps, where they are sidetracked and held under natural refrigeration. They are then ordered forward as the markets appear to require them. This method is not especially satisfactory, because the poultry thaws out en route from the Alps to market and arrives in more or less bad condition.

PREPARING THE SURREY FOWL

The poultry that commands the highest price on the London market is the so-called Surrey fowl. Surrey is a trade name for the superfatted chickens prepared and sold by approximately 100 farmers and small poultry fatteners in southeastern England, mainly in the counties of Sussex and Surrey and in the western part of Kent. The feeding, fattening, killing, dressing, and packing are done under what may be considered farm conditions. By far the greater proportion of the supply originates in the county of Sussex, with the main centers in the towns of Heathfield and Uckfield.

The product is not made up of mature hens, as understood in the United States, but of young cockerels and pullets weighing about 3½ to 4 pounds when dressed. Therefore the term "dressed Surrey or Sussex chicken" would seem to describe this product more accurately.

When displayed on the shelves and counters of the wholesale and retail markets in London beside poultry from the United States and other countries, the contrast between the Surrey chickens and the others is very striking.

The typical Surrey chicken is white in flesh and skin, white in shanks, and covered with white fat. The skin is smooth to the touch and the flesh is so soft that it dents readily under the finger. When laid on the counter the flesh seems to flow slightly and flatten out at the sides of the body. The breast is plump and well filled out, although this well-rounded appearance is due, at least in part, to the custom of breaking the front of the breastbone and cooling the carcass in a squatted position on shaping racks at the time of dressing. Surrey fowl is displayed in the markets undrawn and with head and feet on.

The only poultry that compares with Surrey fowl is the Poulet de Brussels from Belgium, the Poulet de Bresse from France, and some fatted poultry from the Netherlands. American milk-fed poultry, when displayed side by side with it, affords a decided contrast to the Surrey fowl. The American product is usually yellow-skinned, carries decidedly less fat, is firmer of flesh, and more angular in appearance, even when shown in the squatted position. On the other hand, the picking, bleeding, and grading of the American poultry is considered to be superior to that of the native English product. The feathers are more carefully removed, the skin shows fewer rubbed or

torn places, and grading is much more uniform. Birds with crooked breastbones, which would be thrown out as second grade in the United States, are accepted as first grade in the London markets, provided they are otherwise well fleshed and fat. Furthermore, the American custom of grading closely for size and uniform quality is greatly appreciated by the English retailer, as he can buy certain well-known brands without the necessity of personal selection on the wholesale market.

The peculiar quality and appearance of the Surrey fowl on the London market is due to several factors. The finest product is obtained from the native Sussex breed, which has a white skin, white legs, and is about the size of the American Wyandotte. Other white-skinned breeds, such as the Dorking and Orpington, are also used. Crosses from these breeds by the use of English Game and Cornish males are often recommended. The chief requirements for poultry to be fed into the highest grade of Sussex fowl are white flesh, soft meat, quick growth, large frame, and strong vitality. In other words, they are the same characteristics that are desired in American feeding stations, with the exception of the color of the flesh and skin. The American breeds of chickens—Plymouth Rocks, Wyandottes, Rhode Island Reds, and Jersey Black Giants—are equal, if not superior, to the English birds as regards quickness of growth, size of frame, and strength of vitality, but possibly a question might be raised as to whether they had the initial tenderness of flesh.

The other differences between the Surrey and American milk-fed poultry, such as softness of meat and fatness, are largely questions of management and climatic conditions. The practices in management, as used by the fatteners of Surrey fowl, vary greatly from the customary methods of commercial fattening stations in the United States as to rations fed, arrangement of crates or batteries, methods of feeding, length of time of feeding, cramming, individual attention to each bird, dressing, shaping, cooling, and shipping.

The crates in which the poultry is fed are the old-style wooden crates as first introduced into the United States and Canada from England approximately a generation ago. Each crate is about 6 feet long, 20 inches wide, and 18 inches high, with slatted sides, ends, tops, and bottoms. A partition in the center makes two sections holding from four to six birds each, depending upon their size. The fronts have vertical slats, so that the birds may extend their heads and eat from a V-shaped wooden trough hung or supported along the front of the entire coop. The floors are made of slats extending lengthwise of the crate. These slats are about seventh-eighths inch thick, 1 inch wide on top, and spaced about 1 inch apart. The bottoms of the slats are narrowed to approximately three-fourths inch, so the slit between them is wider at the bottom than at the top. This prevents the droppings which fall through from lodging between the slats. The doors usually slide up and down and are made from slats cleated together and held in place by a cleat along the top of the crate.

Steel feeding batteries mounted on casters and holding from 80 to 190 chickens, so common in American poultry-feeding stations, are practically if not entirely unknown to English poultry fatteners.

The wooden poultry-feeding crates are usually arranged in long rows, one crate high, and placed outdoors in a yard during the spring, summer, and fall and in sheds during the winter. Some fatteners keep them in sheds the year around; others operate only in the summer, and the crates are not used during the winter. When arranged out of doors the feeding yards are protected from the prevailing winds by buildings, walls, hedges, fences, and sometimes by windbreaks made of woven rushes in the form of matting. Rain is kept from the birds by boards, roofing, or other arrangements placed on the tops of the crates.

EFFECT OF CLIMATE

The climatic conditions are apparently especially favorable to poultry fattening in southern England. The temperature never becomes uncomfortably warm or excessively cold. Winds are moderate, and the sun never shines with a glare. In view of the discussion now going on in the United States regarding the effect of ultraviolet rays on growth, the direct exposure of the birds to the actinic rays of the sun may indicate one reason for the success of outdoor feeding. Birds with their wings drooping, heads extended, mouths open, and panting, such as are often seen in the farm flocks of our Middle West during the summer, are a rarity in England or in all Europe, except possibly in the far southern sections of the Continent. In fact, special emphasis is sometimes laid on the necessity of keeping the fattening birds warm, whereas in the United States most of the larger feeding stations would like to discover some way of keeping them cool during the summer season.

The length of time of feeding varies with different feeders and with the ability of the birds to stand up under the intensive feeding process. On an average the birds are trough fed from 10 to 14 days and then crammed, usually by machine, from 10 to 14 days longer. In some instances it is not uncommon for the entire feeding period to occupy five weeks. While the birds are on the cramming machine they naturally receive individual attention, and the operators of the machines become so expert that they are able to determine from the feel and appearance of any bird whether it is fattening well or whether a continuance of the process would result in a decrease in flesh. Thus, as soon as the birds have reached their maximum growth and fatness, they are removed from the crates and sent to the dressing rooms, irrespective of the length of time of feeding.

RATIONS

When the birds are first placed in the crates they received nothing but water during the first day. The following morning they receive a light feed composed of ground meals and soured skim milk, buttermilk, or whey. The rations fed vary with each feeder and from time to time in the same establishment, depending upon the weather, with the cost of feed, and the age of the chickens. The basis of the feeding is ground whole oats and sour skim milk, to which other ingredients are added in varying proportions. One feeder may feed approximately 70 per cent ground oats and 30 per cent white corn meal mixed with sour skim milk to the consistency of a thin paste that barely flows. The oats used are specially ground whole oats.

Care seems to be taken that the oats shall be thoroughly dry and ground between sharp stones, so that the resultant meal will be free from long, needlelike fibers. As a conditioner to keep the blood cool in the summer boiled chopped nettles and flowers of sulphur are sometimes added to the ration once or twice a week. Grit is given twice a week.

Care is taken to see that the birds are not overfed at the start of the feeding period. They are given just what they will readily clean up in about 15 minutes. The troughs are then taken away from the crates until the next feeding period. By this means the birds are always kept hungry for each meal, and by carefully increasing the quantities of feed at the end of the fourth day they are cleaning up a full trough of feed twice a day. The feed is usually mixed for one feeding and allowed to stand until the next feeding period, during which time a slight fermentation usually takes place.

CRAMMING

Beyond the 14-day period of feeding in the crates the quantity of food consumed by the chickens tends to decrease, with a consequent slower deposition of fat on the body, unless the bird is forcibly fed. To increase the consumption of food per bird, with a consequent gain in fat after the 12 or 14 days period, the birds are crammed by machine for such length of time as the operator thinks they are gaining in flesh. The experiences in England confirm those in this country that a feeding period of 3 weeks without cramming results in a very much softer flesh than for a 2 week's feeding, even though the rate of increase in weight is not maintained. Gain obtained during the third week by ordinary trough feeding is not, however, considered to be commensurate with the cost of the feed and the effort. The length of the cramming period may vary from 1 to 2 weeks, or in some instances may be even longer.

The cramming machine generally used consists of a reservoir for the food, a rubber-covered tube or flexible rubber tube which enters the bird's mouth, and a foot-controlled plunger which forces the food from the reservoir through the tube into the crop. The feed used in cramming is the same as used in crate feeding, except that it contains a little more milk and flows about as rapidly as thick cream. Sometimes mutton fat is added to the cramming feed at the rate of about 2 pounds to 100 head of poultry, then increased each day until approximately the fifth day, when 4 pounds of fat per 100 head is fed. The method of cramming is, in brief, as follows:

The feeder takes the bird from the crate, holds it under his left arm with its head in his left hand. The neck is extended, the mouth opened, and the tongue held down by the thumb of the left hand. The mouth of the bird is then placed on the tube of the machine until it extends into the neck for a distance of 3 to 5 inches. The extension of the neck allows the tube to enter without scratching the interior of the throat. Thus, with the right hand on the crop, feed is forced into the crop by pressure of the left foot on the treadle of the machine. Then, releasing the treadle slightly to prevent the feed from running out of the spout, the bird is withdrawn from the feeding tube and replaced in its crate. The secret of cramming depends upon the judgment used by the operator in giving just the right

quantity of feed, which is determined by the pressure of the feed in the crop as noted with his right hand. Little feed is given in the first few feedings, but the quantity is increased as the period goes on and as the crop becomes distended and its capacity increased. Particular emphasis is laid upon the point that a bird must not be fed until the crop is absolutely empty. If any feed remains in the crop from one feeding time to the next the bird is replaced in the crate without feeding. The birds are fed twice a day, as nearly as possible 12 hours apart.

This process under first impressions might appear cruel, but when handled by a skillful operator it seems to meet with the entire approval of the chickens receiving the treatment. After they have been on feed for two or three days they become as anxious for the feed from the machine as they do when fed in the crates. If performed by an unskilled operator, it is true that there is danger of tearing the tongue or throat and choking the bird with feed going into the windpipe instead of the esophagus, or too strong a pressure on the treadle may cause a burst crop. A skillful operator feeds from 200 to 300 birds per hour.

Experiences with cramming of poultry in the United States have not been generally satisfactory because of inability to procure skilled feeding labor at a reasonable price and inability to obtain an increased price commensurate with the increased cost of the finished product.

GAINS IN FEEDING

The gains in flesh obtained by the Sussex feeders are approximately the same as those obtained in the United States on the same-sized birds and under the same temperature conditions. Because the birds are taken off feed as soon as the judgment of the crammer indicates they are ready for killing, it is usually impossible to get accurate weights unless the birds are marked and weighed individually on their entrance to the crates, and this, of course, is not ordinarily done. The rate of gain is approximately one-half pound per bird per week during the whole feeding period. The heaviest gain usually comes in the second week of feeding, while the birds are yet eating from the trough. Thus, assuming that in three weeks' time a gain of 1½ pounds is made on the bird, the gain might run 6 ounces the first week, 10 ounces the second week, and 8 ounces the third week, the last week being on the cramming machine. Exceptional birds gain more. It is not uncommon to put over 2½ pounds on a bird in three or four weeks' time with a combination of crate feeding and cramming. No definite costs as to feed, labor, depreciation, and interest are available, but it seems fair to assume that unless a much higher price is obtained for the superfatted poultry the profit would not be enough to pay for the extra labor and feed. After the end of the second week of feeding, the chicken does not seem to be able to transform its feed into flesh or fat with anywhere near the same efficiency as in the earlier parts of the feeding period, even though the quantity is increased by cramming.

DRESSING

After the birds are removed from the fattening crate they are placed in small coops and taken to the dressing room. The dressers

usually sit on boxes or benches. Each one may kill and completely pick the whole bird or one may kill and remove the coarse feathers and another remove the pin feathers.

The killing and bleeding are done in one operation. The picker takes the bird from the coop, which is usually on the floor by his side, draws the wing feathers down to the feet so that the wings and feet are held in the left hand, and stuns it by hitting its head against the coop. Then grasping the head between two fingers of the right hand in such a way that the back of the head is in the palm of the hand, the bird is stretched tautly across the lap and a quick turn of the hand severs the head from the neck and pulls it away about an inch. There is no break in the skin. The blood settles in the space between the head and neck, none escaping from the body.

This method of bleeding the bird, whereby the blood is not removed from the body but concentrated in the neck, has but two advantages to the packer. One is that the method of dressing is cleaner, as no blood is spattered on the pickers, the feathers, or the body of the bird. The other is that there is less shrinkage in dressing, as the bird weighs more with the blood in it. It would seem that the disadvantages outweigh the advantages. When exposed in the market the neck of the bird is the first portion of the bird to decompose and the greenish decomposition running up the neck toward the shoulders can not be considered as giving an appetizing appearance. This large mass of blood in the neck prevents the birds from being carried in cold storage, because of the very rapid decomposition which takes place when the bird is removed and thawed for sale.

After killing, the bird is picked in more or less haphazard fashion while held in the picker's lap. A good picker dresses from 10 to 12 birds per hour.

When the feathers have been removed, the bird goes to the foreman who inspects it and removes any pin feathers which may have been overlooked by the picker. He then squeezes the butts, ties the hock joints together loosely with string, and breaks the breast and coracoid bones by hitting the carcass with a short club in the region of the wishbone. The flesh is then drawn forward toward the front of the bird with the hands. Next the stern is struck against a wall or a post to flatten it and the body is placed in a shaping trough.

These shaping troughs are made of two boards approximately seven-eighths inch thick and about 3 feet long, with edges nailed together at right angles. The back board is 6 inches wide and the front board 5 inches, making a shelf 5 inches wide. The troughs may be used singly or made into racks by nailing boards on each end of the troughs, so that there is a space of about 10 inches between the shelves. The shelves are set at an incline, sloping toward the back, with the front edge about 2 inches higher than the rear.

The birds are laid in the troughs breast down and feet doubled up under the breasts, stern against the back board, with the head and neck hanging over the front edge. The birds are packed closely, side by side, and are prevented from falling over by a brick placed against

the side of the last bird until the trough is full. The wings are folded against the side of the body. When the trough is full a board 4 inches wide and about one-half inch shorter than the trough is placed across the backs of the carcasses just behind the wings. On this board are placed heavy bricks or weights weighing up to 100 pounds or more per rack. The fowls remain in the rack until cold, sometimes for several hours, sometimes overnight, and are thereby set in shape. Cooling is usually done without refrigeration, although a few packers have ice-cooled rooms for the warmer days.

This method of shaping produces a flat-backed carcass with the feet pressed into the breasts. This is the position in which the birds are usually exposed for sale in the markets, where they are placed on a shelf that slants toward the purchaser, so that the backs of the birds show most prominently. The blood left in the neck is concealed by approximately 2 inches of feathers which have not been removed in picking.

PACKING

After the Surrey fowl is cooled it is generally packed in an especial box or crate and shipped to the London market. This shipping box is called a "ped" and holds upwards of 100 pounds of poultry. It is made of thin splints, reinforced with slats of thicker wood, and resembles in appearance the bread or laundry boxes used in this country. Each box is approximately 20 inches wide, 18 inches deep, and 30 inches long. The birds are packed in the ped between alternate layers of straw. Two rows of squatted birds, packed breast down with the heads to the center, compose a layer. The straw used in packing the poultry is straightened before being placed in the ped and between the layers of poultry, so the flesh shall not be unduly bruised. Care is taken that the package be packed firmly, so that there is no shifting of the birds during transit.

Before the war fatted poultry from the Sussex, Surrey, and Kent districts were shipped to London by train. Now practically all are transported by automobile trucks. Trucks leave this district late every night and deliver the poultry to the wholesale or retail markets in London the following morning.

QUANTITY PREPARED

During the war, because of the restrictions on feedstuffs and transportation, together with the scarcity of labor, the volume of the Surrey fowl industry was greatly reduced. Before the war the output in the fattening district, as nearly as can be estimated, was approximately 5,000,000 pounds yearly. Not enough poultry was raised locally to fill the requirements of the fatteners and it was necessary to bring in poultry from surrounding counties and even from Ireland. It is stated that about 300,000 head were brought from Ireland to the Uckfield and Heathfield districts each year. At present there are no importations from Ireland, and the poultry fed is largely of local production.

Estimates made in the London market and in the Heathfield district indicated that the production for 1924 was not in excess of 1,500,000 pounds. But production is increasing and it may be expected that in four or five years the volume will equal that of pre-

war times. Whether there will be an over supply on the London market remains to be determined. The number of Surrey fowl now appearing on the London market is about 5,000 head per week. Some dealers feel that if the number should be increased to 8,000 per week there would be a glut in the market. This shows that while the Surrey fowl is the highest-priced poultry sold on the London market, yet it is considered a luxury and comprises but a small portion, probably less than 5 per cent, of the poultry supply.

FRENCH METHOD OF DRESSING POULTRY

The French method of dressing poultry consists usually of bleeding the bird by cutting the jugular veins with a pair of small scissors or a sharp knife inserted through the mouth; thus there is no opening on the outside of the neck. The feathers are removed as in the case of the English method, more or less laboriously, by holding the bird across the lap of the picker. After the feathers

FIG. 13.—French dressed poultry, packed in two layers, backs up. Box contains 60 head and weighs about 200 pounds. Paris, Halles, Centrals

are removed, the birds are partially drawn, using what, in the United States, is called the Boston method, which consists of inserting the first finger through the vent and drawing out the intestines, which break off at the gizzard and at the vent; thus there is no external sign of the bird having been drawn except the falling in of the abdominal walls. The breast is broken down with a club and the wings are locked in the usual manner, with the tips across the back. This locking also holds the toes of the bird, which have been brought forward by squatting the carcass. The birds are then cooled, shaped, packed in baskets between alternate layers of straw, and shipped to market (figs. 13 and 14). They are exposed for sale either on counters or suspended by the head from hooks. Almost invariably they are exposed with the back to the purchaser. The locking of the toes in the wings makes it possible to hang them up without destroying the flat-backed appearance.

Another method of French preparation, which is also used to some extent in Italy, is the sewing of the birds in cloth. After the bird has been killed, picked, drawn, the breast broken down, and the legs

locked in the wing, the whole carcass is wrapped in a specially shaped cloth, which is drawn very tight and sewed. The birds are then placed on shelves for cooling. This cooling process is hastened by sprinkling the cloths with water. Often the whole line of birds is covered with another cloth which has been soaked in water, thus cooling by evaporation. The cloths sometimes remain upon the birds until they go to the retailer, where they are removed and returned to the original shipper. More often the cloths are removed from the carcasses upon leaving the farm, and the birds are packed in hampers with alternate layers of straw and are so shipped. By sewing the warm carcasses in these cloths the birds are made to look especially compact after cooling, the wings and legs being compressed into the body flesh, so that the resultant product looks like a solid roll of poultry.

FIG. 14.—French dressed poultry, packed necks up, single layer. Basket contains 36 head, weighing about 120 pounds. Halles Centrals, Paris

BELGIAN METHOD OF DRESSING POULTRY

The poultry exposed for sale in the Halles Central in Brussels is probably more extensively manipulated before sale than in any other market in Europe. The birds are killed by cutting the throat from the outside and the feathers are removed by lap picking. The breastbones are broken with a club, and the feet are cut off about an inch below the hock joint. The skin of the neck is slit from between the shoulders to the base of the skull, and the head is cut off where it joins the neck. The bird is fully drawn from the rear by making an incision across the abdominal cavity and removing the intestines, gizzard, liver, lungs, etc., through the opening. The crop and windpipe are then removed and the wishbone taken out. The breast is then further broken down by reaching in through the opening from the neck and cutting with game shears the coracoid bones, which extend from the shoulders to the sternum or breastbone. The neck is then bent around and the head end thrust into the abdominal cav-

ity through the opening between the shoulders. The flap of skin is then drawn over the neck and across the back, where it is held in place by locking the wings across it and by a trussing string. This trussing string is drawn through the bird by passing a long needle through the wings, the second joint, the body of the bird, the second joint on the opposite side, the wing and back through the skin flap, and the two ends drawn tightly together and tied. Then the pin bones are broken away from each side of the backbone at the rear, the hock joints tied to the rear of the bird by threading a string through the joint, the rear end of the backbone, and the other hock joint, and tying. As a result of this breaking down of the breastbone and the trussing, when exposed for sale a chicken is very flat and resembles the dressed appearance of a duck rather than a chicken. This method of dressing is also known to some extent in Denmark. Although it makes a pleasing appearance in the market, the bird is hard to carve when on the table, because of the presence of a large number of broken bones. The giblets, the head, and the feet, which are cut off, are sold separately.

A REFRIGERATED POULTRY PACKAGE

When shipping local less-than-carlot shipments of poultry by express to such distances that cooling is necessary or when it is desired that the birds reach the consumer in the best possible condition, a very ingenious method of refrigeration has been devised in Italy. A deep hamper is lined with parchment paper. Then a layer of finely crushed ice mixed with sawdust is placed in the bottom of the hamper. This mixed ice and sawdust has a thickness of approximately 4 inches. This is covered with another piece of parchment paper. On this parchment is placed a layer of poultry, packed as tightly as possible, butts up and necks down; then another piece of parchment paper; then another layer of poultry, packed necks up and butts down. The whole is then covered with another piece of parchment paper, on top of which is spread another layer of crushed ice and sawdust, which in turn is protected by more parchment paper. After the lid is closed there is a tightly packed package of poultry with ice and sawdust on each side. At first thought it would seem that it was useless to use the sawdust in the ice because of its tendency to prevent melting, with a consequent loss of refrigeration, but as a matter of fact the slow melting of the ice is exactly what is desired. The poultry is not quite as cool as it would have been if the ice was not mixed with sawdust, but the refrigerating effect is continued longer and the poultry is cooled the two or three days it may be on the road. This same method of packing is used for butter.

WHOLESALE SELLING OF POULTRY

Live poultry is sold at wholesale in almost exactly the same manner as in our large cities in the United States. The poultry is shipped to a commission man or a jobber by an individual producer or a smaller dealer in the country. Sales are made by the commission men to the retailers and returns are made to the shipper on either a percentage commission or a fixed-cost basis. When on a commission basis the jobber pays the freight or other delivery

charges and any local taxes or customs duties. Then a commission of approximately 4 per cent of the amount of the sale is charged. When sold on the fixed-price method the charges are usually based upon the number of head rather than upon the weight of the birds. These charges vary in different places, depending upon the markets and the items which are supposed to be covered by the charges. For instance, in Rome fixed charges include the payment of the local customs tax imposed on foodstuffs by various municipalities in Europe. The comparatively few car-lot shipments of live poultry that are made are handled almost exclusively on a jobbing basis and are not consigned to commission men.

Dressed poultry is handled usually on a commission basis. Each small dresser ships his hamper of poultry to a commission man, who in turn sells it to the retail trade, deducting the expenses of transportation and his commission from the returns made to the shipper.

MARKET PRICE QUOTATIONS

Market price quotations are made in various ways. In some places daily auctions are held which establish the quotation. In others the quotations are arrived at by private treaty and are reported to newspapers, and in others a combination of private trading and municipal official supervision establishes the quotation. This is the most extended method. The public wholesale and retail markets in most cities in Europe are under the supervision and control of a city official. The dealers in these markets, in cooperation with the controlling official, determine the market quotations, which are used as a basis for the payment of shippers and for sale to the retailers. There are practically no private trade-reporting publications such as exist in the larger American markets. The prices as agreed upon are published in the daily papers and in the official market publications of the various cities. This plan of arriving at quotations seems to work fairly well. The consumers feel that they are protected, and the wholesalers and the jobbers have a more or less steady quotation upon which to trade.

In some instances the quotations on the market are made by committees of the dealers and are supposed to represent the prices for one week, on the basis of which the transactions in that week will be adjusted. This method is more liable to misinterpretation by the consumer, and when prices become extremely high the consumers are inclined to feel that there is an agreement between the dealers to obtain more than a fair profit.

RETAIL SELLING OF POULTRY

Live poultry is sold at retail in Europe in several different ways. Nearly every town in continental Europe has one or more public markets in which farmers, small dealers, and larger dealers sell fruits, vegetables, meats, bread, poultry, eggs, and many other articles of food. To these open markets poultry is brought in crates or baskets, or the birds are tied by the feet and laid on the pavement. The housewife makes her selection personally and buys either by the piece or by weight. Weighing is usually done with steelyards, which have now practically disappeared in the United States.

It is often possible, as in Berlin, for the consumer to select while alive the fowl or goose which she wants, and it is dressed in the market stall while she waits for it. This practice of dressing the fowl in the market stall is even allowed in the magnificent Smithfield Market (wholesale) in London.

Live poultry is also sold direct to the consumer by peddling from door to door. In Italy, for instance, it is not uncommon to see a peddler going through the streets with a net-covered basket of birds on his head, from which the heads of the poultry protrude. There are also special poultry and egg shops in most every city, wherein only these items are sold.

A striking characteristic of the open markets in continental Europe is the large number of vendors and the small volume of busi-

FIG. 15.—Portion of open retail market in Belgrade, Yugoslavia. Building in background is devoted exclusively to the sale of eggs (jaja)

ness done by each. It is not uncommon to see a woman sit from early in the morning until noon disposing of 15 or 20 hens and 5 or 6 dozens of eggs (see fig. 15). The wages made are small because of the small volume, yet the spread between the wholesale and retail price is as large, if not larger, than that prevalent in the United States.

Dressed poultry is not sold in as many different channels as live poultry, as its sale is usually confined to inclosed markets, special poultry and egg shops or butcher shops which handle beef, veal, mutton, goat, horse, donkey, and water-buffalo meat as well. In southern Europe the carcass of a chicken is often handled in a similar way to the carcass of any other meat animal. It is sold in a drawn condition, and even cut up into portions so that it is possible

to buy wings, breasts, backs, legs, heads, feet, giblets, and even blood separately. The butchers often have chickens hanging in the shops from which they will cut off any section wanted by the customer. The prices for the various cuts vary. The most valuable part is the comb, which reaches prices equivalent to $1.50 a pound in United States weights and currency. Heads and feet are usually sold for use in soup stock, although in some parts of eastern Europe the brains and the eyes are also considered a delicacy. Refrigeration of any kind is practically unknown in any of the European retail markets. This means that the meats and poultry must be sold shortly after killing or withdrawal from storage.

Furthermore, scarcely any poultry is stored in a frozen condition in continental Europe. In the cities having cold-storage warehouses some of the retail butchers lease small spaces, wherein they carry small stocks of meats and some poultry. The poultry in these storages is usually merely wrapped in paper and the birds piled one on top of the other. It is seldom placed in boxes or baskets. The poultry thus stored often is some that has been withdrawn from a sluggish market and as a consequence is of such quality when reexposed for sale as to detract from the reputation of cold-storage goods.

The meat retailers, like all dealers in perishable-food products in Europe, are especially favored by the climatic conditions. Except in extreme southern portions, the nights are generally cool and the days do not become excessively hot. Another striking feature is the absence of flies both in the markets and in the homes. Flies are so few that screened windows and doors are practically unknown.

MARKETING OF GEESE

The goose industry in Europe is as separate from the rest of the poultry industry as are swine from cattle. The raising of geese is generally confined to those sections of continental Europe where the strip system of agriculture prevails and the people live in villages. The geese are raised for feathers, meat, fat, and pâté de fois gras, which is made from the enlarged and engorged livers of geese resulting from cramming the geese in confinement until they are so fat that they can hardly walk.

Europeans use large quantities of goose feathers in mattresses, pillows, and comfortables for the bed. It is hard for an American to realize the enormous quantities thus used. Feather mattresses are often 18 inches thick, and pillows are about three times the size of the ordinary American feather pillow. It is claimed that in Bulgaria the number of feather beds a peasant has indicates his wealth. Feathers also form an important part of the daughter's dowry.

Geese are fed for market in three distinct ways—by pen fattening, by cramming, or by a combination of both. When they are fattened in the pens they are sold mainly for meat purposes, the object being to have a well-fattened, tender-meated bird. The superfat geese, resulting from cramming, are used for the fat and for the manufacture of pâté de fois gras.

PEN FATTENING

The best way of describing the pen fattening of geese is to describe the methods in vogue at the village of Libus, Czechoslovakia. This village, situated about 4 miles from Prague, contains less than 1,000 inhabitants, of which, according to Maria Kuklovia, of the Biological Institute, Prague, nearly two-thirds are engaged in the fattening of geese as a trade.[2] The annual production of fatted geese in this village is approximately 200,000 head. Geese are obtained from the surrounding territory and carloads are brought in from such foreign countries as Poland, Hungary, and Italy.

Fattening of geese is a family business in which all help, and the trade has been passed down from father to son for several generations. One person can care for 1,600 to 2,000 geese. The period of fattening is ordinarily a matter of three weeks, after which the geese are sold and replaced with fresh ones. The geese are kept in pens either in the open or under sheds in the courtyards of the village houses. These pens in which the geese are confined are approximately 15 feet square and hold from 30 to 50 geese. The geese are bedded with straw or stand on slatted floors, through which the droppings fall onto the ground beneath. When bedded with straw, fresh straw is added as the old straw becomes soiled, so that by the end of the fattening period the straw may be 12 or 16 inches deep in the pen. The feeders seem to think that the geese do better on the slatted floors than they do on the straw bedding. Troughs for feed are placed along the edges of the pens, so that the geese put their heads through and eat. Between the pens extend narrow, shallow troughs of drinking water. Small sticks of wood float in these troughs for the geese to play with. It is stated that if the geese do not have these playthings they fight with each other.

The feed consists of boiled corn, crushed oats, and soaked oats. The corn is boiled or steamed in large kettles until it is thoroughly soft. It is then placed on the floor and mixed with sufficient crushed oats to take up any excess moisture, and is fed in a rather dry, flaky condition. When placed in the pens the birds receive, for the first three or four days, whole oats which have been soaked and swelled in lukewarm water for 12 to 24 hours before using. Then the mixture of boiled corn and crushed oats is added gradually to the swelled oats until about the tenth day, when the ration consists entirely of boiled corn and crushed oats. From the sixteenth to the twenty-first day the corn ration is decreased, so that the finishing of the birds may be entirely upon swelled oats. The average consumption of feed is estimated at 1½ pounds per head per day.

The gains obtained in feeding vary with the season, which extends from May until January. During the spring and summer months the geese fed are largely old geese, which do not gain as fast as the young geese, although their initial weight is greater. Although no actual weights could be obtained, the information was that during the summer the gain ran from 2½ to 3½ pounds per head in three weeks. Thus, an old bird weighing 12 pounds would weigh approxi-

[2] Kuklová, M. Aviculture en Tchécoslovaquie. 31 pp., illus. Prague. 1924. (Czechoslovak Republic Min. Agr.)

mately 16 pounds after feeding. The gains on young geese during the fall months run from 3 to 4 pounds per goose. A young goose weighing 8 to 9 pounds would dress out at about 11 to 13 pounds when killed.

DRESSING

At the end of the three weeks' feeding period the geese are killed and plucked. The killing is usually done in the afternoon of the day before the geese are to be sold on the market, and outside help, usually women and children, is employed for the picking.

Killing consists of hanging the goose by the feet, holding the head in the left hand, cutting a gash in the throat with a knife, and catching the blood in a tin cup. After the bird is bled, it goes to the pickers, who sit on benches or boxes and remove the feathers as the goose is held in the lap. The picking is a slow operation, as the downy feathers are removed without the use of steam, resin, tar, or any other aid, except a pinning knife. When pinfeathers are exceptionally hard to withdraw, it is customary for the picker to put the mouth to the goose and remove the feathers with the teeth.

After the feathers are removed, the geese are placed upon boards out of doors in the shade, the heads and beaks are washed and wrapped with paper, and tied in place with string. The entrails are not removed. The birds remain upon the cooling boards covered with a cloth overnight, when they are packed with straw in baskets and trucked or shipped to market. The blood from each goose, which coagulates in the cups, is wrapped in parchment paper, and one clot is sold with each goose.

CRAMMING GEESE

The cramming of geese is carried on in Czechoslovakia, Germany, France, and other sections of Europe, and is usually done by the farmers, a few geese at a time. The cramming of geese consists of forcing boluses of food down their throats by hand. The boluses are made of barley meal, oatmeal, corn meal, or buckwheat flour mixed with milk to about the thickness of dough and rolled between the palms of the hands until they are about 2 inches long and ⅜ inch thick at the center, tapering to rather pointed ends. The geese are kept in individual pens or held between the knees or under the arm of the feeder. The mouth is opened with the thumb of the left hand, the bolus dipped in milk to lubricate it, and worked down the throat with the thumb and fingers of the right hand on the outside of the neck. In some cases the geese are trough fed and allowed to eat all they will, and are then superfed by cramming. Double the amount of gains can be made by cramming as can be made by straight trough feeding, so that the weights of the final goose when dressed reach as high as 20 to 25 pounds. The geese are usually fed from two to four times a day, as near as possible at equal intervals. One woman can cram about 30 geese in an hour.

SMOKED GOOSE BREASTS

A delicacy, especially in Germany and Denmark, is smoked goose breast. It consists of the best meat of the breast preserved by smok-

ing. In the retail markets of Berlin the breasts of the geese are often removed for smoking and the rest of the carcass sold in a fresh condition.

PREPARING AMERICAN POULTRY TO MEET FOREIGN DEMAND

SIZES

The sizes of fowls and chickens that are most desired in England, the largest poultry-importing country in Europe, aside from the especially fatted Surrey fowl, are those which weigh from 30 to 42 pounds per dozen. These sizes comprise our large broilers and small roasters, and are the least desirable weights in this country. Because of the English demand for this size of stock, this poultry has already become known in this country as export poultry, and the flat style of package sometimes used for it has achieved the name "export box," because the dimensions and style of package were introduced into this country from England.

FAT AND COLOR

American poultry is now the best non-European poultry which appears upon the London market, but it can be improved in two directions, (1) by increasing the quantity of fat it carries and (2) by breeding, feeding, and grading for light-colored flesh. London wants a fat, light-colored chicken. No changes are necessary in the killing, the bleeding, and the cooling of American poultry, if the method used is killing by bleeding in the mouth, wrapping the heads, and cooling on hanging racks, except those improvements in workmanship which are also advantageous for domestic markets.

SQUATTING

The English retailer prefers that the birds be squatted—that is, the feet folded against the breast—because this is the way he displays them in his market. To this end it has been customary in the past for some American packers to build special cooling racks on which the birds can be cooled in a squatted position, and to pack them in what is commonly termed the "squat pack," single layers, two rows, six to the row, backs up, breasts to the center, with the heads extending between the birds in the opposite row. It is the opinion of the London wholesaler, however, that squatting is not as necessary as the American packer has seemed to think. They say that, other things being equal, the retailer will buy the box containing the squatted birds, but he prefers quality to posture, and the slightest superiority in quality will cause him to take birds unsquatted rather than those squatted. These opinions seem to indicate that it is not worth while for our packers to squat poultry unless they know that it is going to be sold abroad. The broiler style of package, which is packed single layer, two rows, breasts up and out, heads bent under back, and legs extended between the birds in the opposite row, is a fairly satisfactory package for export. It may also be claimed that while this method of packing does not show as plump a breast nor as broad a back on the chicken as does the squat pack, yet the feet are not pressed into the breasts and the true conditions of the body are more easily judged.

The dealers in London are rather emphatic, however, that the birds be packed closely in the box. The tendency toward leaving large spaces in the center of the box, such as happens when broilers are set up against the side, is not considered desirable. Two rather minor objections are raised to this method of packing. One is that the birds require more cubic space in transit by boat, and the other is that they do not remain frozen as long after unloading, because more surface is exposed for thawing.

In brief, therefore, a description of the requirements of American broilers for export would be as follows:

The birds must be milk fed, well covered with flesh, and as light in color as possible. They must be well bled, carefully picked, heads wrapped, undrawn, properly cooled and packed tightly in strong, single-layer boxes, 12 to a box, two rows of 6 birds each, either squatted or legs extended. The boxes should be lined with parchment paper and be securely nailed. It is not necessary to wrap each bird, unless the poultry will carry better in storage therefor.

Considerable complaint is encountered in England because American frozen poultry is often spotted on the skin as a result of the drying out of the skin in the freezer. This rather scabby appearance, even though it may not seriously affect the quality, militates against the ready sale from wholesaler to retailer. It would seem as if some investigations in this country, looking toward the elimination of this defect, would be worth while not only for foreign trade but for domestic benefit as well.

As is now customary, each box should be marked on its end with the number, the weight, the brand, and the kind of poultry it contains. As in the United States, the English merchants are very keen in remembering brands and trade-marks, and a brand once well received can be easily resold. Care must be taken by American packers to see that their brands run uniform in quality from year to year, as well as from box to box in the same year. Not many different brands of poultry are sold in England; therefore a decrease in quality from one year to the next in any one brand is readily noted, with a consequent loss in the demand for that mark.

COMMERCIAL HANDLING AND MARKETING OF EGGS

Methods of handling eggs in Europe vary widely from those in the United States in details of packing, storing, and selling. The means of gathering and testing are not unlike American practices, although on the whole they are apparently less efficient and less accurate.

GATHERING EGGS FROM PRODUCERS

In Europe eggs are gathered from the farmers by (1) hucksters or, as they are termed in England, "higglers," (2) country and village stores, (3) collectors who operate for dealers or cooperative societies, (4) village auctions, (5) direct sales from farmers to wholesalers, (6) farmers on public markets, or (7) delivery to private customers. These methods of collection are similar to those in the United States, with certain minor differences.

The huckster who operates on his own capital and sells wherever he thinks he can find the best market is not so widely prevalent as in the United States. He is confined largely to sections of rural England, Ireland, Scotland, France, Italy, and Austria. In Denmark, and the Netherlands, where farms are scattered, the huckster is replaced by the collector, who gathers eggs for a cooperative society or for a large retail dealer. In Denmark this collector is employed by the local cooperative societies or operates from a branch of some large egg collector.

In countries which have the village and "strip" system of agriculture, poultry is necessarily confined to the villages, and the eggs are easily gathered in large lots. Thus, because all of the eggs are closely produced, they are often assembled by one person who may represent the farmers cooperatively or who may be a dealer in eggs, and they may be collected from several villages by a collector operating from a larger town. It is not infrequent for the dealers in these small villages to preserve eggs in limewater during the flush season for sale during the fall and winter. This concentration in villages also encourages the selling of eggs by auction or to private buyers on established market days. This system of community gathering and selling probably reaches its highest development in certain sections of France, Italy, Czechoslovakia, and Austria, but it is also customary in parts of other countries.

In Hungary, Rumania, Bulgaria, and Poland there are few consuming cities in proportion to the rural population. Distances are greater, farms are larger, and production of eggs more widely distributed than in the more densely populated sections of continental Europe. Large percentages of the eggs produced in these countries are therefore exported, and the eggs flow in more well-defined channels from producer to consumer. The trade is more generally organized through large exporting firms which maintain their branches in various towns at which the eggs are concentrated, tested, graded, and packed for shipment. This system is similar to that of the large egg packers in the United States. The branch stations receive eggs from hucksters, country storekeepers, or farmers and ship them to larger packing houses for preparation for shipment.

QUALITY BUYING

Eggs are bought in Europe by weight and by weight and edibility, and by straight count: that is, without attention to interior quality, size, or cleanliness. In central and southern Europe eggs are ordinarily purchased without examination and at certain prices per dozen irrespective of size. The same method prevails in Great Britain and Ireland.

Purchases on a strict quality basis are confined to the cooperative societies, which require each member to mark his eggs before delivery. Their control extends to the nests of the hens, and their methods even affect the breeding for increased size of eggs. Their rules require that the eggs be gathered frequently and sold at least once a week. Their grading for size, as far as the producer is concerned, is done automatically by paying for eggs according to their weight, so the heavier the eggs the greater the return per egg to the member. Testing for interior quality is done by candling the eggs.

Any unfit for food are thrown out and a heavy penalty therefor deducted from the returns to the producer whose number appears on the eggs so discarded, but there is not the same closeness of grading for interior quality and cleanliness as is prevalent among egg cooperatives in the United States. More or less badly shrunken eggs, eggs with weak yolks and weak whites, and eggs with comparatively dirty shells may be included in the export grades provided they have good weight.

The collectors of private dealers operating in competition with the cooperative societies which purchase by weight also buy eggs at so much per kilogram, but no deductions are made for spoiled eggs. The loss thus incurred is borne by the dealer. The percentage of bad eggs in Europe is probably far less than in the United States, because the summer temperatures are not sufficient to cause germinal development and consequent spoilage.

Producers receive the highest price for eggs in those localities which are nearest the markets or wherein the cooperative methods of buying are most widely practiced—Denmark and the Netherlands. The expansion of cooperation now taking place in Poland will probably result in increased production, improvement of quality, quicker marketing, and consequent increased returns to the producers in that country.

PAYMENTS TO PRODUCERS

Producers are paid for their eggs in cash by the huckster or dealers, in trade by stores, or when they are sold cooperatively the producer may receive an advance on his eggs at the time of delivery, with dividends at the end of the year, or he may wait for payment until the eggs are sold and returns received. These methods of payment are analogous to those in the United States.

It is useless to give details of prices paid to the producer in various countries, because they not only vary from time to time throughout the year, but they also vary with the fluctuating rates of exchange, distances from market, different systems of buying, and gradations in quality. The lowest prices paid are in Bulgaria, Rumania, Yugoslavia, Hungary, and probably Russia. This is because the eggs in these countries are generally poorer in quality, smaller in size, at greater distances from the market, less efficiently marketed, and are produced under more adverse climatic conditions than in northwestern Europe.

PURCHASE OF EGGS BY WEIGHT

In view of the agitation in the United States, both by producers and consumers, for the purchase and sale of eggs by weight, the results obtained in Denmark, where eggs have been purchased from the producers by weight for several years, are here considered.

In this little country, whose egg exports have furnished from 20 to 50 per cent of the total egg imports into Great Britain, the purchase of eggs by weight was originally established by the cooperative egg-marketing associations, which have been in existence since 1895. These associations require that the eggs be fresh, gathered frequently, and marketed within seven days from the date of laying, thus covering the prerequisities necessary to the marketing of an egg of good interior quality.

Eggs are sold not only upon their interior quality, but also upon their size. Therefore, the Danish cooperatives felt that the easiest way to grade eggs for purchase and insure the financial advantages of improved size reaching the producers, would be to buy eggs by weight. By this means the farmer whose hens laid the larger eggs would receive more money per egg than the farmer whose hens produced smaller eggs. It also meant that the small eggs would remain and be consumed upon the farms, as they would not bring as much money per egg as the larger ones when sold. The results of this method have been striking.

The average size of the Danish egg has increased through the selection of fowls which laid large eggs until now the Danish egg probably averages greater in weight than that of any other country in the world. It is not uncommon for cases of Danish eggs as sold for export to weigh as high as 19 pounds to 10 dozen, which is equivalent to 30.4 ounces per single dozen. Eggs weighing 18 pounds to 10 dozen, or at the rate of 28.8 ounces per single dozen, are very common. The average weight of the American egg is probably between 23 and 25 ounces per dozen. The gradations in export sizes of the Danish egg with their percentages of different weights may be typically described by giving the number of cases and weights of the eggs as received at one cooperative egg-packing plant. In this plant in August three days' receipts totalled 235 cases. These were divided as shown in Table 3.

TABLE 3.—*Weights of eggs received at a Danish cooperative egg-packing plant*

Number of cases	Total	Weight per 10 dozen	Weight per dozen	Per cent of total
	Dozens	*Pounds*	*Ounces*	
70	5,600	18	28.8	22.0
50	6,000	17	27.2	23.6
95	11,400	16	25.6	44.9
20	2,400	14	22.4	9.5
235	25,400	----------	----------	100.0

There are no eggs in this lot weighing at the rate of 15 pounds to 10 dozen or 24 ounces per single dozen, which is the ordinary weight for good merchantable eggs in the United States. This demonstrates careful grading on the part of the packers. The 15-pound eggs were sent in two directions, most of them doubtless going into the 16-pound eggs and as few as possible going into the 14-pound eggs. But few eggs weighing less than the 14 pounds to 10 dozen (22.4 ounces per dozen) were received, showing that the purchase by weight worked to prevent their being sent to market. Considering the 16, 17, 18 pound eggs as one class, the astonishing fact is observed that over 90 per cent of the Danish export eggs are above the normal weight of eggs as marketed in the United States.

Eggs weighing 14 pounds to 10 dozen and 19 pounds per 10 dozen do not form a large proportion of the eggs which are exported, because the small eggs do not leave the farms and hens do not lay many, perhaps fortunately, of the supersizes. The largest proportion of the eggs are of such size that they can be sold as 16-pound eggs.

Eggs are purchased in Denmark by weight, but they are sold at wholesale in England by the 10 dozen or long hundred, with weight used as a descriptive term. For instance, the Danish cooperatives will offer eggs to English dealers at 20 shillings per long hundred for 16-pound eggs, and 21 shillings for 18-pound eggs. If they can get the increased price for the larger eggs they are grateful. Their experience has been, however, that a percentage increase in price commensurate with the increase in weight is rarely, if ever, obtained. Often eggs weighing 18 and 19 pounds have brought no more than the 15 and 16 pound eggs. In other words, the demand for the extra large egg at an increased price is very limited. The difference in price per long hundred between 16-pound eggs and 18 or 19 pound eggs is rarely more than 1 shilling (approximately 23 cents). Thus when eggs are offered at 20 shillings per 10 dozen for 16-pound eggs and 21 shillings per 10 dozen for 18-pound eggs the percentage increase in price is only 5 per cent, as against 12½ per cent increase in food value. Furthermore, as eggs go higher in price this percentage increase becomes less and less.

Thus Danish experience has conclusively shown that at present it is impossible to receive higher prices commensurate with the increase in size of the eggs. Danish operators also admit that the purchase of eggs by weight has resulted in a decrease in profits to the producers of eggs as a whole, and that the payment by weight is not fair to the producer of normal eggs as his returns are diminished by the amounts paid for the heavy eggs. They further state that the market prefers, and is satisfied with, eggs which weigh from 15 to 16 pounds per long hundred, which is equivalent to 24 to 26 ounces per dozen. These results are confirmed by the cooperative egg packers in the Netherlands, who deplore the fact that they can not obtain increased prices for their largest eggs commensurate with their greater weight.

TESTING AND GRADING OF EGGS

European eggs are tested for their interior quality by the use of open candles, by special egg-candling devices similar to those used in the United States, by holding the egg in the left hand and shading the eyes with the right hand, by holding the egg at the end of a tube placed in front of the eye, and by specially equipped pocket flash lights. They are candled by the use of one-hole candles, two-hole candles, and multiple-hole candles wherein trays of eggs containing from 60 to 120 eggs are placed over the light or lights, whose rays are thrown through the eggs into a dark space above.

In the exporting countries two methods of candling generally prevail—one, the candling device, such as is generally used in the United States, consisting of a light inside a metal cylinder with a hole opposite the flame or filament (fig. 16); the other consists of perforated trays on which the eggs are placed above a bank of electric lights. These two methods and the exposed flame of a candle are also used in the wholesale markets of the cities.

The methods of holding the egg in the left hand and shading it with the right and the use of a tube are usually used in the sale of eggs from the retailer to the consumer in open markets or in shops that have no electric light. Some of the retail shops which sell eggs

as a specialty are equipped with electric testers, and every egg is tested before it is sold to the consumer. Especially equipped flash lights, consisting of an ordinary pocket flash light with a little flaring cylinder about three-quarters inch in diameter and three-quarters inch long soldered thereon, are used in wholesale markets for making inspections of various lots of eggs.

The candling of eggs in the egg-exporting sections of central and southern Europe, such as Poland, Hungary, Yugoslavia, and Italy, may be described as follows: When the eggs arrive from the hucksters or the branch egg-assembling stations they are removed from the original baskets or crates by the candler and tested before an electric candle which is equipped with either one or two holes. Usually two eggs are held in front of the light at one time, irrespective

FIG. 16.—Egg-candling room at Posen, Poland (formerly Germany). Eggs are taken from export cases, candled and placed in local shipping cases

of the number of holes in the candle. The eggs are graded according to interior quality only and placed loosely in boxes or baskets, the bottoms of which are lined with straw. No attention is paid to grading according to size, color, or cleanliness by the candler, as this is done by the packers after the eggs are removed from the dark room to the light packing room. The grades of eggs made by candling consist of those for export, local eggs, checks, leaks, and those unfit for food.

In the export grade are included all that show sufficiently good interior quality to enable them to stand the vicissitudes of the journey to the market for which they are intended, whether it be Berlin, Paris, or London. Less attention is paid to the shrinkage of the air cell and the degree of visibility of the yolks than in the United States. The air cell must be localized and regular, but it may be of

considerable size. Using the tentative United States grades as a comparison, the export grade of eggs in continental Europe would consist of U. S. Standards or better. In other words, this grade would include U. S. Specials, Extras, and Standards.

Eggs that are graded out as fit for local consumption in the country where the eggs are candled consist of those having weak, watery whites, very large air cells, flat yolks, and cracked and leaking eggs. Eggs containing blood rings, of which there are suprisingly few because of the cool European climate, and those having small mold spots on the interior of the shell, are sold for consumptive purposes, although at a much cheaper price and to the very poorest class of trade. Apparently any egg that contains an unruptured yolk is considered fit for human food.

The eggs considered unfit for food comprise those that are black rots, addled, partially hatched so the chick is visible, and those that are badly molded.

DANISH METHOD

The candling of many eggs at once is practiced most extensively in the countries of Denmark and the Netherlands, two different methods being used. The Danish method consists of placing the eggs on perforated trays large end up. These trays hold from 60 to 120 eggs, varying in different establishments. The sides of the trays are deep enough so that they may be stacked one upon another without breaking the eggs. The trays of eggs are then taken to a darkened testing room, which is usually a small, dark, doorless closet just large enough to hold one tray of eggs and the person doing the testing. The candling device consists of a box in the form of an inverted pyramid, the top opening of which is the exact size to hold the trays of eggs. In the bottom and sloping sides, which are usually made of bright tin, are from two to four electric lights. Thus the eggs are illuminated by the light passing upward through the holes in the tray. The tester removes all eggs which are unfit for food, consisting of black rots, partially hatched eggs, eggs with broken yolks, or any that are moldy. He also takes out the eggs which are badly shrunken or which have weak yolks, leaving on the trays only those eggs whose interior quality is fit for export purposes.

This method of testing is reasonably rapid, but it does not grade as closely as is necessary in this country. As the eggs are not turned before the light, the condition of the white and yolk can not be judged accurately. Neither is it possible to detect germ development or slight blood rings which are so prevalent in the United States during the hot summer months. After candling, the eggs are sent to the packers, are graded for size and cleanliness, and are placed in long double-partitioned export cases.

NETHERLAND METHOD

The method of testing eggs in the wholesale houses of the Netherlands is similar to that used in Denmark, except that a more elaborate device is used. The Netherland egg-testing apparatus is more efficiently designed for its place in the cycle of operations than anything elsewhere known, not excepting the United States. Much

thought seems to have been expended on the problem of saving labor from the producer to the consumer. To this end the eggs are received in fillers and flats, packed in large square boxes holding 100 eggs in a layer. The square fillers are made of very heavy cardboard and hold 10 rows of 10 eggs. The fillers rest on heavy flats that are strong enough to hold a filler of eggs without bending. The fillers are also perforated with holes that come directly beneath the center of each cell in the fillers. Thus when the eggs are placed in the fillers, large end upwards, each egg stands up in a hole in the flat.

For testing, the flats are removed from the crates, fillers and eggs together, and placed on the testing table. This table is circular, about 6 feet in diameter, and revolves around an axis in the center. It contains from 8 to 10 openings, each holding a flat containing 100 eggs. When the table is revolved the tray full of eggs passes over the testing box in the dark candling room, which is built in the form of a sector of the table and above it. The testing box is in the shape of an inverted pyramid or cone containing electric lights from which the light is thrown up through the eggs which still remain in the fillers. The tester, looking down upon them, removes all eggs which are unfit for food and of inferior interior quality, and places them in depressions on the table according to their classification. The table is then revolved so that the tested eggs pass from the candling room and another tray of eggs is brought before the eyes of the operator.

Workers on the outside of the candling room remove the trays and the various grades of eggs as they come from the tester, their place being taken by untested eggs. This continuous method of testing eggs is much faster than the simple tray method used in Denmark, and is probably more accurate, because the eggs remain in the fillers, which allow less leakage of light from one space to another when an egg is removed. Yet this method can not be deemed satisfactory when high accuracy in determining the interior quality is desired, as the eggs themselves are not revolved in testing.

EGG PACKAGES

There are almost as many different ways of packing eggs for their home markets as there are countries in Europe, but for the export business they are all practically agreed upon one form of package.

LOCAL EGG PACKAGE

In Italy two styles of packages are commonly used for domestic eggs, a woven basket and a crate, which is used both for eggs and for poultry. The woven basket is about 12 inches deep, 24 inches long, and 15 inches wide, and holds about 600 eggs, packed in alternate layers of straw held in firmly by a woven top tied in place. The crates used are similar to the American rod poultry coop, about 24 inches long, 18 inches wide, and 14 inches deep. The eggs are packed between alternate layers of straw, about 1,000 being placed in a crate (fig. 17).

In France eggs are packed in wooden boxes in alternate layers of straw and hold about 1,000 eggs. The method of packing eggs in

straw or wood shavings and in various sized containers is prevalent for the local markets of France and southern and eastern Europe. In Germany, Denmark, the Netherlands, and Belgium cases containing flats and fillers similar to the American package are used. Instead of holding 3 dozen, as in the American case, each filler holds 100 eggs, being 10 eggs square; thus a square package 10 fillers deep will hold 1,000 eggs. The fillers and flats are necessarily much heavier than the American fillers and flats. The paper stock from which they are made is apparently about one-eighth inch thick.

In the Netherlands the flats are perforated with round holes, so that the egg fits into the hole and remains in an upright position when the fillers are removed. This aids in the candling of the eggs under the mass system, as previously described. By varying the

FIG. 17.—Wagonload of eggs packed in straw in rod poultry coops. Each coop contains 1,000 eggs. Rome, Italy

depths of the boxes the capacity of the cases is varied from 200 to 1,000 eggs, although the larger boxes are seldom used. The usual capacity is 400, 500, or 600 eggs.

EXPORT CASES

For export purposes all of the countries use the same style of box (fig. 18). The inside dimensions of this box or crate are about 69 inches in length, 21 inches wide, and 10 inches deep, with a double partition in the center, allowing the box to be sawed in two, making a complete box out of each half without opening the package. The material used in these boxes is an odorless, well-seasoned wood, usually poplar or fir. Pine is used, but not extensively, because of its odor. The end and partition material is about seven-eighths inch thick. The sides, tops, and bottom are made of strips of approximately one-half-inch lumber, each strip being 4 to 5 inches wide.

Spaces of one-half to three-fourths inch are left between the strips to allow, theoretically, for ventilation (fig. 19).

These boxes will hold 1,440 ordinary-sized eggs; that is, eggs running from 22 to 26 ounces to the dozen. Larger eggs are packed 960,

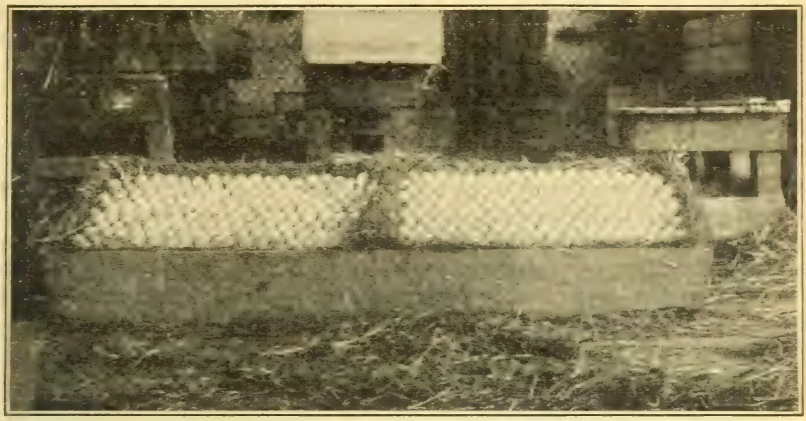

FIG. 18.—Export egg case commonly used in Europe. Each box holds 1,440 eggs

FIG. 19.—Export cases of eggs in storage cellar, Pozen, Poland, showing style of package

1,200, or 1,380 to the box and smaller eggs from 1,620 to 1,680 to the box. This selection of 1,440 as a basic unit for export eggs seems to have been chosen with foresight, because it is a multiple of the units of purchase and sale used in most of the countries, as shown by Table 4.

TABLE 4.—*Unit of quantity employed in selling eggs in principal European countries*

Country	Unit of quantity
England	Long or great hundred, 120 eggs×12=1,440.
Germany	Schock, 60 eggs×24=1,440.
Czechoslovakia	
Poland	
Denmark	Score, 20 eggs×72=1,440.
Sweden	Mandel, 15 eggs×96=1,440.
Italy	Dozen, 12 eggs×120=1,440.
France	Do.

Four American cases holding 30 dozen each are equivalent to 1,440 eggs, or one European export case.

As in the United States, the boxes are made by box makers and shipped to the egg packers in a knockdown form. By far the greatest supply of boxes is produced in Transylvania, formerly in Hungary, now in Rumania. The weight of the empty box varies from 35 to 40 pounds (fig. 20).

FIG. 20.—Making up export egg cases, Pozen, Poland

PACKING MATERIALS

The eggs are packed in these export crates in alternate layers of straw or wood wool, or a combination of both. Wood wool, as it is called in Europe, is similar to the wood excelsior commonly used for egg packing in the United States, except that the strands are about three-sixteenths to one-fourth inch in width, but very thin, so that it has the appearance of masses of narrow, white or cream-colored ribbon.

Because the eggs come in intimate contact with the straw or the wood wool, the packing material must be absolutely dry to pre-

vent the molding of the eggs. The better packers are very particular on this point, spreading out the wood wool or the straw often in the sun, but usually in lofts, so that it becomes perfectly dry.

In Italy straw is used more extensively than wood wool. In Yugoslavia, Rumania, Hungary, Ukraine, Poland, Ireland, and the Netherlands wood wool is used almost entirely. In Denmark a combination of straw and wood wool is used.

METHODS OF PACKING FOR EXPORT

After the eggs have been candled they are handled on large trays, as in Denmark or the Netherlands, holding from 60 to 100 eggs, or they are placed in single boxes holding up to half a case of 720 eggs, or in double boxes holding a full export case of eggs. The eggs then go to the packers, whose sole duty it is to grade them for size, cleanliness, color, where color selections are made, and pack them in the cases. The method of packing is as follows:

Usually two packers work on one case, with the case between them. A layer of straw or wood wool is placed in the box; then, by taking 3 eggs in each hand, a layer of eggs made up of 10 rows of 18 each is placed in each half box. The eggs in each row lie side by side, touching each other. The rows themselves are slightly staggered, so that the points of one row fit in between the ends of the eggs in adjacent rows. By taking 3 eggs in each hand, the counting becomes more or less automatic, as 3 double handfuls fill a row and 30 double handfuls a whole layer. A layer of packing material is then placed upon the eggs and the process repeated until there are four layers of eggs in the crate, or 1,440 eggs, with packing material on top. The packing material projects above the box so that it is compressed when the lid is nailed on. The lid, composed usually of three pieces of sufficient width to allow a space of about one-half inch between the pieces, is nailed lengthwise across the case, special care being taken to nail it into each center partition.

In packing small eggs, 21 are placed in a row, made up of 3½ double handfuls, 35 double handfuls filling the layer, in which event the case contains 1,680 eggs.

Two packers working together fill from 3 to 5 cases per hour. They become so skillful at grading the eggs for size that the net weights of the eggs will approximate the standards used upon the market for which the eggs are designed. For instance, eggs marked for the English market at 16 pounds to the long hundred of 10 dozen will weigh within an ounce or two of 16 pounds. Eggs for Berlin, weighing 60 kilograms to the thousand, will not be many grams away from the marked weight.

This style of package is not fitted for the packing of eggs of ungraded sizes. If small eggs alternate with large eggs spaces are left in the rows, which permits movements of the eggs in the cases, with consequent breakage. This may be one reason why eggs are sold by weight so extensively in Europe.

The weight of a full case of eggs varies from 200 to 225 pounds and requires two men to handle it.

Because of the different standards of weight and sizes of egg packages used in the various countries the following table of weight conversions offers a chance to comprehend more easily the relation

between the trade quotations in different countries. The English unit of pounds for 10 dozen has been used as the basis of computation.

TABLE 5.—*Corresponding trade weights of American and European eggs*

United States		England	Continental Europe		
1 dozen	30 dozen	10 dozen	1,000 eggs	1,200 eggs	1,440 eggs
Ounces	*Net pounds*	*Net pounds*	*Net kg.*	*Net kg.*	*Net kg.*
19.2	36	12	45	54	65
20.8	39	13	49	59	71
22.4	42	14	53	64	76
24.0	45	15	57	68	82
25.6	48	16	60	73	87
27.2	51	17	64	77	93
28.8	54	18	68	82	98
30.4	57	19	72	86	103

ADVANTAGES OF THE EUROPEAN EXPORT CASE

For European conditions of transport and climate the long, strongly made case has certain advantages as compared with the 30-dozen veneer case which is standard in the United States. The cost of case and material per dozen at the present rate of exchange figures out about 25 per cent of the corresponding cost of cases and fillers in the United States. When properly packed the eggs are bound so tightly in the cases that there is very little breakage. The weight of the case requires that two men carry it, and they are therefore handled more carefully. Because the eggs are packed side by side with rows touching each other the space occupied per dozen is slightly less than the space occupied by the American case. This difference is only 4½ per cent. As cases are made of sawed lumber firmly nailed, ropes can be put around them and they can be lifted by a derrick from cars or wagons into the holds of ships, or they can be piled to the roof in freight cars.

DISADVANTAGES OF THE EUROPEAN CASE

The disadvantages of the European case are mainly those of handling, storage, and the number of eggs that they contain. The European egg dealers advance the theory that the European case contains too many eggs to enable it to be sold to many retail dealers without overstocking them. To this end, therefore, eggs are being packed in half cases, having the same length and breadth but containing only two layers of eggs instead of four, thus a quarter case contains 30 instead of 60 dozen.

Such a quarter case occupies over two and one-half times the floor space of an American case in a retail shop, where space is usually at a premium. As the eggs are packed in straw or excelsior it is less easy for the retailer to expose them in the original package. With the American style of case it is necessary merely to lift the lid, remove an excelsior pad, and the eggs are exposed for sale. Because of their retail advantages, several of the larger European dealers are interested in the use of the American case for shipment in their own countries or to places where no ocean voyage is included in the transportation. Because of their high cost in the United

States, however, and the expenses of transportation, the American-style package can not be used in Europe for the original packing of eggs unless the cases and fillers are manufactured there. Some American cases in which exported eggs have been shipped, mainly from Canadian ports, are used as secondhand cases in England and Ireland for the transportation and storage of English and Irish eggs.

The results of storing eggs under refrigeration in the European export cases have caused some storers to remove the eggs from the cases and store them in open trays. Unless both the eggs and packing material are absolutely dry when packed the eggs are almost certain to mold in storage. Also the large quantity of packing material used prevents the cold air from reaching the eggs promptly, thus allowing the eggs to continue decreasing in quality, even though the room temperature is about at the freezing point.

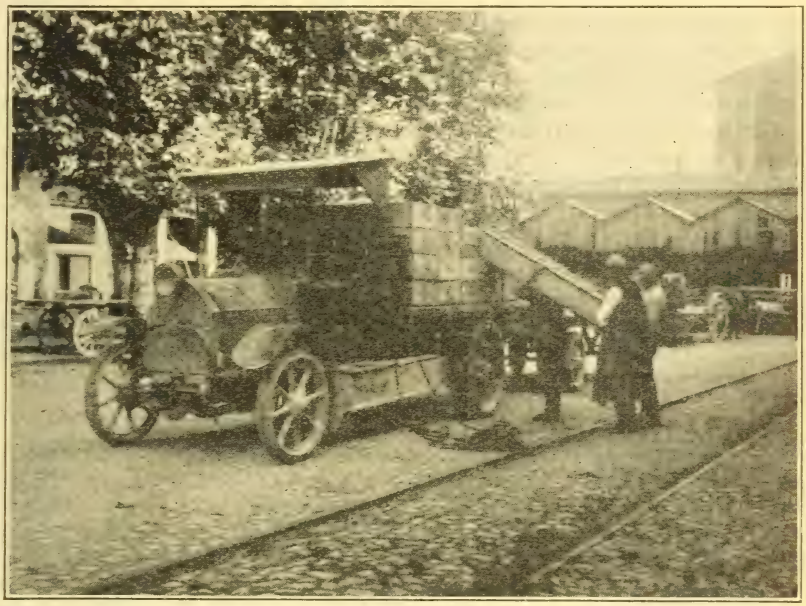

FIG. 21.—Loading a truck with eggs for export shipment, Padua, Italy

TRANSPORTATION OF EGGS

Transportation of eggs from the farm to the small dealers is accomplished, as in Czechoslovakia, by women with baskets on their backs or, as in other countries, in baskets and buckets by farmers and by hucksters who pack them in straw in crates or large baskets. Poultry coops are used as containers by packing the eggs in straw. From the huckster's viewpoint this is very satisfactory, as only one style package has to be carried on his wagon. Most of the eggs are hauled by wagons drawn by oxen or horses or in the low countries by dogs. But few motor trucks are used in rural service. From the small villages and the larger cities eggs are shipped by train, by boats on canals, and to a less extent by truck (fig. 21). This method is gradually increasing.

In carload shipments the eggs are packed in the standard European export cases and the cars are loaded to the roof. These cars are about one-half the length of the ordinary American freight car, very light in construction, and 10 long tons (22,400 pounds) are considered a carload. Thus it requires 100 to 110 cases to make a minimum car, which also fills the car completely.

There are practically no refrigerator cars in Europe. Because of the cooler summer climate it is not as necessary to use refrigerator cars as in this country, yet they would be of great benefit in such countries as Russia, Rumania, Bulgaria, Yugoslavia, Poland, and Italy, from which countries direct transportation can be made to the large continental markets or to channel ports. Because of the method of packing eggs in wood wool in boxes, however, there would be but little advantage in refrigerated transit unless the eggs were precooled before packing, because the package would prevent the refrigeration from reaching and cooling the eggs.

Eggs take fast freight service in Europe, as do other perishables. Solid trainloads of eggs are not uncommon, especially from Russia. The forwarding of freight is often in the hands of large forwarding companies. These companies arrange for the assembling of carloads of eggs at certain points and then forward them by fast freight to large markets like Berlin or Paris or to ports like Riga, Memil, Danzig, and Hamburg for transhipment to England.

PRESERVATION OF EGGS

Eggs are preserved from the season of high production in the spring to the season of scarcity in the fall by two methods, pickling and cold storage, of which pickling is by far the more common and most extensively used.

PICKLING

By pickling is meant the preservation of eggs by immersion in limewater, water glass, or salt, or combination of them. By far the greatest number is preserved by immersion in a plain saturated solution of lime. The preserving vats are located in a cellar, where the temperature is cool and even. The wooden kegs and casks formerly used are now being replaced by cement vats which vary in size. Some of them are about 10 feet long, 10 feet wide, and 6 feet deep, and hold approximately 60 European cases of eggs of 120 dozen each. The method of preparing the limewater consists of making a saturated solution from quicklime, placing the solution in the vat until it is about half full, then putting the eggs in the solution by hand or by means of loosely woven baskets, care being taken that no cracked eggs are included. The baskets of eggs are submerged in the limewater and carefully emptied. As the specific gravity of eggs and limewater are approximately the same, there is very little danger of breakage, because even a very fresh egg sinks slowly. Badly shrunken eggs with large air cells, having less specific gravity than limewater, rise to the top whence they are removed. As the eggs are put in, the level of the solution rises until when the vat is full there is about 2 inches of limewater above the tops of the eggs.

Special care is taken not to disturb the eggs after they are placed in the solution until the time comes for their removal. A slight

crust of lime salts forms on the top of the solution, which should remain unbroken. This crust seems to prevent further evaporation of the solution and keeps the eggs cleaner than would otherwise be the case. When the eggs are removed from the vats, they are taken out in a reverse manner from that in which they are put in. The liquor may be drained off and the eggs removed by hand, or, as is more customary, they are scooped up in baskets while submerged in the solution, thoroughly rinsed, and allowed to dry overnight. They are then packed in ordinary cases and sold.

Limed eggs do not bring nearly as high a price on the market as do fresh eggs; neither do they bring as high a price as those preserved by cold storage. The difference in price between limed eggs and cold storage is probably due to the fact that the eggs that are limed are often of inferior quality to those put up by refrigeration. Or, as the liming vats are often operated in connection with grading establishments, it is the smaller grade of egg which would ordinarily be sold in the vicinity of the establishment, rather than the eggs which are large enough for export, that is pickled. Again, dirty eggs are often placed in the limewater, because the solution removes the stains and they have a better appearance than they would if they had been shipped in their original condition.

In the cooperative associations of Denmark, where the producers are required to stamp their number on each egg, the placing of these eggs in limewater in the spring removes the member's number, so that they may be sold unnumbered as pickled eggs in the fall. This works to a decided advantage to the cooperative associations, because it enables them to sell their inferior grade of eggs unmarked, thus removing them from competition with their better stamped grades.

The secret of the success of the preservation of eggs by lime solutions in Europe undoubtedly lies in the cool climatic temperatures prevalent in the northern portion of the continent. It is doubtful if the eggs in limewater vats ever reach a temperature above 55° F. That this is the determining factor is indicated by the fact that the preservation of eggs by limewater in Italy is not a success unless the vats are kept in exceedingly cool subterranean rooms or in refrigerated rooms, as is done in Milan. The flavor of the limed egg is different from that of the fresh egg, as it has a slight salty alkaline taste. The yolks and whites are weak, so that the yolks are more likely to break when the eggs are opened. There is, of course, no shrinkage in weight, as there is no chance for the egg content to evaporate.

REFRIGERATION

The preservation of eggs by refrigeration is confined to the larger markets, like Rome, Milan, Vienna, Berlin, Paris, London, and Liverpool. In the northern cities the eggs are cold stored in the export case as received from the packers. Because of the large quantity of straw or wood wool which surrounds the eggs, it is difficult for the refrigerated air to penetrate the packages. Consequently, if the eggs are warm when placed in storage, deterioration continues unchecked for several days, and if the packing is slightly damp, mold develops and runs rampant.

In Italy it was found that eggs stored in the original packages under refrigeration did not keep as satisfactorily as they did in the more northern sections, probably because the eggs stored were the summer eggs produced in Yugoslavia and Italy after shipment to northern markets had declined. These eggs, having a natural higher initial temperature, would deteriorate more rapidly and for a longer period of time after storing than those produced under cooler climatic conditions.

To remedy this situation, the system has been developed of removing the eggs from their cases and storing them loose in trays in the refrigerated rooms. Shallow trays, containing 30 dozen eggs each, are placed on slides in racks one above the other. The trays have slatted bottoms, and there is a space between them of about 1½ inches—just enough for the slide between the top of one tray and the bottom of the tray above it. Each tray is marked with the kind and grade of eggs it contains. The refrigeration used in these rooms may be either direct ammonia expansion with piping in the rooms, brine circulation, or indirect refrigeration by cooled air. The temperatures maintained vary with different establishments from 0° C. (32° F.) to −1° C. (30.2° F.), of which 0° C. is the more common. The shrinkage by storing in racks as against original cases is believed to be somewhat more. In Milan it was stated that the shrinkage amounts to 2 kilograms (4.4 pounds) per thousand eggs from April until November, or slightly less than 2 per cent. The eggs maintain their flavor and interior quality for about eight months, after which they deteriorate rapidly.

Storage of eggs in American-style cases is practically unknown except in England and Scotland, where eggs have been packed in the United States and Canada and shipped in the spring, or where native eggs have been packed and stored in secondhand American cases.

WHOLESALE SELLING OF EGGS

Eggs are sold at wholesale in the larger European cities by commission men, jobbers, and brokers. These agencies perform practically the same function as similar organizations in the United States and in approximately the same manner. The commission men receive shipments from various independent firms and make returns based on the sale of the eggs, less commission and handling charges. The jobbers of eggs make direct purchases and then resell. The jobbers are more often egg collectors than is the case in this country. Various firms in London, Copenhagen, Berlin, and Vienna are not only jobbers in their own cities, but maintain branches under their own control throughout the producing sections of Europe. Some of these concerns have 30 or more branches distributed over four or five countries.

The methods of making payment for eggs at wholesale are nearly the same as in the United States. Eggs to commission men are shipped open, or the shipper draws a draft on the commission man for a partial value of the shipment. There is often a close relationship between the banks and the trade, especially in central and southern Europe. Sometimes the banks are directly interested in the firms, and all transactions are done through these banks.

Before the war the trade channels were well organized and seemed to unite at London, which was and still is the principal egg-consuming center of Europe. Since the war the establishment of new countries and realignment of boundaries has resulted in the disassociation of banks and the disintegration of some companies, with a consequent disruption of trade, which has not as yet been reorganized to its former efficiency. The newer countries are somewhat jealous of the older countries and often their people are slow to enter into trade agreements with citizens of other countries. Channels of trade have been diverted in some instances. Whereas eggs from the territory which is now Yugoslavia formerly went to England, larger portions of them are now diverted to Berlin, Vienna, and Italy, although it is only within the last year that Berlin importations have shown a rapid increase.

WHOLESALE PRICES OF EGGS

There are no daily sales of eggs on egg boards by means of offers and bids as in the larger markets of the United States. Neither are there any private or governmental price reporters upon whose reports so much faith is placed in this country. Prices are determined as a result of auction sales as in Rotterdam and Amsterdam, reports of committees as in Copenhagen and London and municipal quotations as in Paris and Milan. The London quotations as issued by the committee of the London egg trade, which meets every Monday morning, is considered by dealers in continental Europe to be the governing quotation. The London quotation, however, is in turn influenced very strongly by the Danish committee quotation, which comes out on Thursday and which is fixed by the representatives of the cooperative egg-selling organizations in Denmark. Thus it may be stated that indirectly the cooperative egg societies of a little country about half the size of the State of New Jersey control the egg market quotations of Europe.

In arriving at their quotations, the Danish committee considers all of the factors entering into the egg trade, such as supplies from other countries, season of the year, potential production, quality, etc. These quotations are maintained for one week commencing every Friday morning and are used as the basis for Danish sales in England and other countries and for the payment of advances to the local cooperative societies, which in turn use them as a basis of payment to the individual members. Although they are adhered to as a basis for making advances to members, they are not always adhered to in sales, except in the cases of contracts made between retailers and the societies based upon them. Eggs not covered by contract are offered to various dealers at the quotation or slightly above, depending upon the opinion of the seller as to what the market will bear. If sales can not be made at quotation or above, reasonable offers are accepted at less than quotation.

In cities like Milan, Rome, and Paris, the markets are more or less under municipal control and prices are set by committees of dealers, market officials, and representatives of the consumers. In some instances attempts have been made to fix these prices more or less arbitrarily, but with rather unsatisfactory results. Where at-

tempts have been made to fix the price without due consideration to market supplies, consumption, and trade practices, they have resulted in a scarcity of supplies, if the price was set too low in comparison with other towns, or in an oversupply if the quotation was set too high, with the consequent demoralization of the market. If the price was set too low there would not be eggs enough to go around and premiums would be paid by the retailer for them. If the price was too high, concessions would be granted by the wholesaler to the retailer in order to move the eggs.

The most satisfactory quotations have been those which have been made by observation of unrestricted trading between wholesalers, commission men or jobbers, and the retail trade.

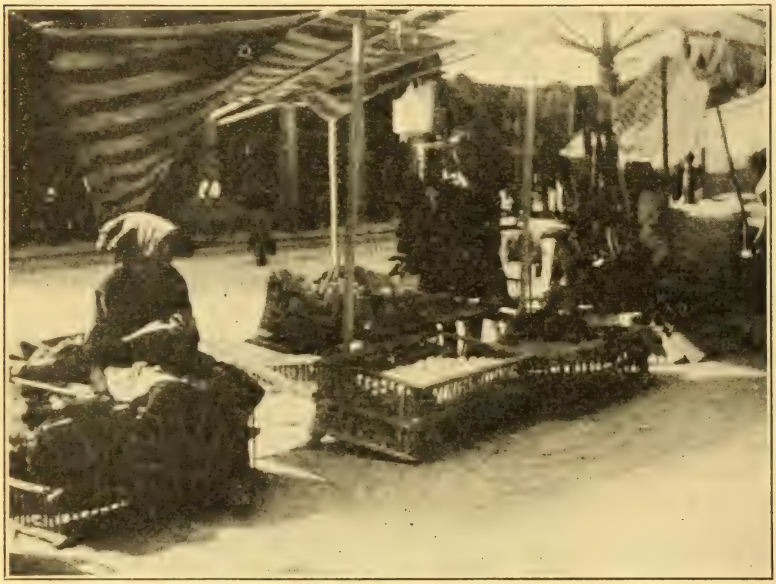

FIG. 22.—Retail egg merchant, St. Pauls Market, Rome, Italy

A NOISELESS AUCTION

In Amsterdam, Rotterdam, and other sections of the Netherlands egg auctions are established where the various cooperative egg-marketing circles or dealers can send their eggs for sale by auction. Upon receipt at the auction rooms the eggs are tested and sampled. A list is prepared of the different lots as to names of shippers and quantities, and each lot is given a number. A list of the lots to be offered for sale, showing consignees and lot numbers and quantities, is prepared and posted in the auction room. When the auction opens the patrons seat themselves on benches or chairs, each of which is equipped with an electric push button which connects with a mechanical auctioneer. This apparatus consists of a large dial approximately 3 feet in diameter, the edges of which are marked with numerals representing gulden and cents. A finger, like the hand of a watch, moves slowly around the dial from the highest amount to the lowest.

When about to offer a lot for sale the attendant at the auction calls out the name of the seller and the number and grade of the eggs offered. He then starts the finger on the dial at a figure known to be higher than the price that will be paid. When the finger reaches down to the amount which a patron is willing to pay for the eggs offered, he presses the button at his side, which immediately stops the finger and shows the number of his seat at the side of the dial. The eggs are then declared sold to that person and another lot offered. If two patrons press the button at the same instant, the machine locks and there is no sale. It can be seen that this method prevents any argument as to who made the bids and is more rapid than vocal auctions. A sale takes a little over a minute for each lot offered.

RETAIL SELLING OF EGGS

Eggs are sold at retail in various ways—by grocery stores, meat markets, public markets (fig. 22), direct from dealers to consumers and specialized egg stores. In such stores as grocery and meat markets the eggs are displayed in baskets or boxes, according to their grade and country of origin. These displays are not particularly attractive, because little attention is paid to the cleanliness of the containers, and the eggs themselves are mixtures of clean and dirty eggs. Practically no eggs are sold in dozen cartons. In England eggs are priced by the dozen. In some other countries—for instance, Italy—they are sold by the piece; that is, so much an egg. In the public markets and sidewalk markets throughout Europe, eggs are sold in special stalls. Here they are offered at various prices according to grade. The different grades are selected in accordance with their cleanliness and size rather than their interior quality, which may result in considerable juggling of grades. For instance, as in Naples, a woman may have eggs in baskets marked 10 or 11 or 12 soldi and she will never run out of any grade until her entire stock is sold. If the eggs in the 10-soldi basket are sold first, she selects the poorest ones from the 11-soldi basket and renews the stock. If the eggs in the 11-soldi basket are sold rapidly, she makes selections in both directions from the 10 and 12 soldi baskets (fig. 23).

In some cities, as in Rome, there are retail stores on the main business streets that sell nothing but eggs. In these stores the eggs are usually tested by electric testers before delivery to the consumer (fig. 24). It is uncommon for the seller to furnish wrapping paper or sacks or other containers for eggs. Usually each housewife brings her own basket and buys what eggs she needs, placing them with other foodstuffs. When wrapping paper is available, it usually consists of old newspapers. Paper and twine, so commonly used in this country, are very sparingly used in the markets of Europe.

CONSUMPTION OF EGGS IN GREAT BRITAIN

Domestic production of eggs in Great Britain from all flocks of fowls in 1922 was estimated by the Ministry of Agriculture [3] at 1,750

[3] Ministry of Agriculture and Fisheries, Great Britain. Departmental Committee on Distribution and Prices of Agricultural Produce. Interim and final reports. 3. Meat, poultry, and eggs. Pp. 104. London, 1924.

million. Adding to this the net imports from Ireland and other countries, amounting to 2,575 million, there is estimated total con-

FIG. 23.—Retail egg stall, street market, Naples, Italy

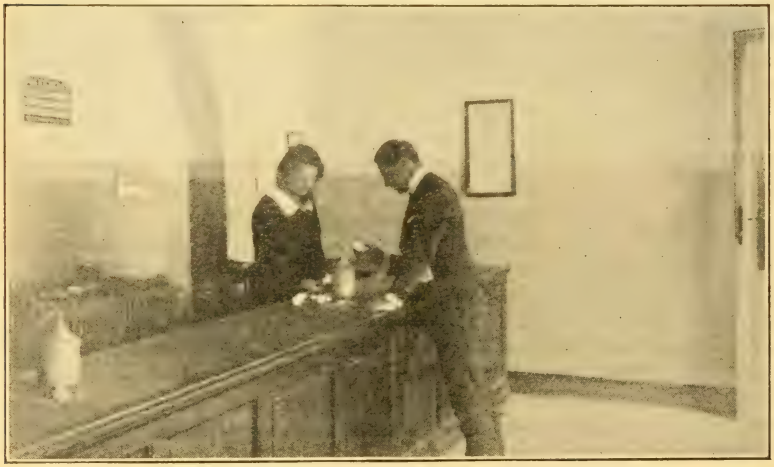

FIG. 24.—Testing eggs in retail egg store, Rome, Italy

sumption in Great Britain of approximately 4,325 million eggs in 1922. The Statesman's Yearbook [4] gives the population of Great Britain at nearly 43,000,000 for that year. From these figures the

[4] The Statesman's Yearbook, p. 14. London, 1922.

apparent yearly consumption of shell eggs per person in Great Britain is 100 eggs. Calculated on the same basis the average per capita consumption in Great Britain for 1913 was 124 eggs per annum. Thus, the consumption of shell eggs has apparently decreased between 19 and 20 per cent from pre-war figures. On the other hand, to regain the ordinary pre-war consumption Great Britain must produce or import, or both, about 25 per cent more eggs than in 1922. Of course the question rises as to what effect

FIG. 25.—Type of package used for selling dried eggs for domestic consumption, England

the importation of frozen and dried eggs, especially from China, has had on the shell-egg consumption. That it has some effect is shown by the fact that dried eggs are sold in the retail shops for household use. They are even packed in cartons represented to contain 1 dozen "fresh eggs" in "golden flakes." The words "golden flakes" however, are in very small letters, so that the impression obtained is that the package contains fresh shell eggs (fig. 25).

Assuming as a basis of computation that 1 pound of liquid yolk or liquid albumen is equivalent to 1 dozen eggs in the shell, the

importation of liquid and dried eggs as given in the statistics of the imports and exports for the United Kingdom is equivalent to 322,000,000 eggs in the shell. This includes the albumen and other forms of eggs used in technical trades as well as those sold to confectioners and bakers and for household purposes. Assuming that all of these eggs replace the shell eggs for food purposes, the increased consumption per capita would not be increased over eight eggs and would still fall far short of pre-war consumption. This decrease in consumption is probably due to the increased price of eggs, lack of employment, and a general increase in the cost of living. Under these adverse conditions eggs are usually one of the first articles curtailed by the housewife and usually without thought as to the relative value of other foodstuffs. The cessation of imports of eggs from Russia, which just before the war amounted to 53 per cent of the total importations into the United Kingdom, has also been advanced as a reason for decreased consumption. The lack of Russian eggs may have increased the price of eggs in Great Britain and thereby decreased the consumption. But if consumption had been maintained at the increase in price, eggs from other sections of the world would have been available, so it would seem that the Russian effect was secondary rather than primary.

AMERICAN EGGS FOR EXPORT

The exportation of eggs to Europe is confined almost exclusively to Great Britain. It is necessary, therefore, to describe only the demands and requirements of the British market.

COLOR

Great Britain prefers brown eggs to white eggs, although there are not the differences in price that have been prevalent in the past between white and brown eggs in the United States. The higher prices paid in London for eggs from the Netherlands are due largely to their brown color. Eggs from Barneveldt, Netherlands, are of an especially deep brown color. No breed of fowl in this country, not even excepting the Brahma, produces eggs of the intensely brown color of the Barneveldt fowl. Shippers of eggs in some European countries purposely mix their white eggs with brown on the theory that the brown ones will help to sell the white on British markets.

SIZE AND CLEANLINESS

Extra large eggs sell more readily than those of medium size, yet there is seldom a difference in price commensurate with the increased food value. Eggs that weigh 16 pounds to the 10 dozen are, on the whole, a satisfactory size for British trade. American eggs weighing not less than 45 pounds to the case will fall in this class.

British markets are more lenient in their discrimination against dirty eggs than the best American markets, but this tolerance does not extend so far as to permit the exportation of dirty eggs, as such, to Great Britain at a profit. As in this country, absolutely clean eggs are more easily sold than those that are slightly dirty. The

large proportion of moderately soiled eggs in British retail markets is perhaps due to the greater rainfall in the British Isles and consequent muddy feet of the fowls.

INTERIOR QUALITY

Generally speaking, the best grades of eggs sold in England show more shrinkage than do the best grades in the United States. That is, less attention is paid to fullness of egg. On the other hand, the white must be firm and no evidence of heat or germinal development is permissible. Here again is seen the reflection of the European climate on the quality of the eggs. In the cooler summer temperature eggs deteriorate much less rapidly, because germinal development proceeds very slowly, if at all.

FLAVOR

The emphasis placed on the character of flavor in eggs by the British dealer is astonishing. Slight variations in flavor that would pass unnoticed in the United States are deemed very important in England and other parts of Europe. An exporter in northern Italy will say that his eggs are sought on the London market because of their superior flavor. Irish eggs are also highly regarded in this respect. These distinctions are not confined to the detection of off or bad flavors, but also consider the variations in true egg flavors which are characteristic of eggs from various sections of different countries.

Probably this discrimination has been brought about by the custom of eating soft-boiled eggs direct from the shell. When served on the table a soft-boiled egg is supported by its lower end in a porcelain or metal standard, the top of the shell is cut or carefully chipped away, and the contents eaten with a small spoon. By this means the aroma and flavor are conserved. There is no chance for odors to pass off, as occurs when the egg is first broken, under the American custom, into a cup or glass.

The reputation of American eggs on European markets has suffered in the past because of bad flavor, which may be divided into two classes—storage flavor and absorbed odors. The storage flavor is that bitter, acrid taste found sometimes in poor quality of cold-stored eggs. The absorbed odors complained of are mainly those of citrus fruits, as lemons or oranges. These fruity flavors may have been caused by contaminating odors reaching the eggs while under refrigeration on steamers in transit. But whatever the cause, the effect has been that the sale of all American eggs has been hurt in European markets.

Canadian eggs, on the other hand, have an enviable reputation in England because they must meet the Canadian Government export requirements as to quality, and the British dealer feels that he is protected thereby. The Canadian Government also watches its English egg trade very closely through trade commissioners in England and through egg specialists.

PACKING

Although the ordinary veneer case containing 30 dozen eggs packed in ordinary fillers and flats with excelsior pads is sufficiently strong for export purposes to Canada, Mexico, and Cuba, where

eggs are sold in solid car lots, they are not considered strong enough for shipment to Europe. To stand the transfer from car to steamer and unloading on the docks in Great Britain requires stronger cases and fillers. The heavy American export case made of sawed lumber equipped with No. 1 fillers and flats and excelsior pads, as are now used, makes a very satisfactory export package. The cases stand transportation well and are preferred by the English retailer to the flat, excelsior-filled box commonly used in Europe, because they occupy less floor space per dozen and the eggs are more easily and readily exposed for sale.

UNITED STATES EGGS SUITABLE FOR EXPORT

From an examination of eggs in several British markets as received from various countries, it would seem that the American eggs best adapted for export to Great Britain are brown eggs that would grade as U. S. No. 3 Extras, U. S. No. 4 Extras, or U. S. No. 1 Standards as described in the proposed United States wholesale grades. These eggs would weigh 45 pounds net to the case, should be of uniform size, with a firm air cell not over three-eighths inch in depth, firm white, no appreciable germinal development, sound and clean in shell and of good flavor.

Eggs such as these are produced in large quantities throughout our large egg-producing section in the central United States. They compare very favorably with good Danish and Netherland eggs of the same size and weight as to quality and are cleaner in shell.

American eggs better than this grade, such as U. S. Specials and U. S. No. 1 Extras, under the tentative official grades would probably command a higher price in this country than could be obtained in Great Britain.

Eggs poorer in interior quality, such as U. S. No. 3 Standards or U. S. No. 4 Standards and smaller-sized eggs of any grade, would come into direct competition with Polish, Russian, Hungarian, Bulgarian, and Egyptian eggs, of which rapidly increasing quantities are becoming available for British markets.

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April 16, 1926

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